The Builder.

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ILLUSTRATIONS.

Islington Central Library, Holloway-road ..... Mr. H. T. Hare, F.R.I.B.A., Architect.
Middle Hill, Hook Heath, Surrey ..... Mr. W. A. Aickman, F.R.I.B.A., Architect.
Chapel of the Red Mount, King's Lynn ..... Measured Drawings by Mr. Ralph Surridge.
Aqueducts of Ancient Rome ..... From Photographs.

Illustrations in Text.

The Aqueducts of Ancient Rome.—IV.:—
Fig. 10. Ponte S. Antonio ..... Page 112
Staircase Windows, United Provident Institution. Designed by Mr. J. Dudley Forsyth ..... Page 115
Window. Ditto. Ditto ..... Page 117
Chapel of the Red Mount, King's Lynn ..... Page 120
Illustrations to Student's Column:—
Figs. 4 to 6 ..... Page 125

CONTENTS.

	PAGE
Cambridge and Architectural Education	107
The Labour Party	108
The Grissell Medal Designs: Structurally Considered	108
Notes	109
The Aqueducts of Ancient Rome.—IV.	111
Letter from Paris	112
Competition for the New Y.M.C.A. Building in Manchester	113
The Architectural Association	113
The Architectural Association Spring Visits	119
The Surveyors' Institution	119
Fifty Years Ago	120
Illustrations:—	
Central Library, Islington	120
Middle Hill, Hook Heath, Woking	120
The Chapel of the Red Mount, King's Lynn	120
Aqueducts of Ancient Rome	121
Camberwell School of Arts and Crafts	121
The London County Council	121
Applications under the London Building Act, 1894	121
Architectural Societies	122
Engineering Societies	122
Books—"Lockwood's Builder's, Architect's, Contractor's, and Engineer's Price-Book for 1908"; "Laxton's Builder's Price-Book for 1908"; S. F. Walker's "Electric Wiring and Fitting for Plumbers and Gasfitters"; S. S. Campion's "Northampton—With Its Surroundings"; M. C. F. Morris's "Nunburnholme: Its History and Antiquities"; "Transactions of the St. Paul's Ecclesiological Society," Vol. VI., Part II.	123
Correspondence:—	
A Suggested Origin of the Mediæval Hall	124
Safety of Chimney-stacks	124
Yorkshire Federation of Building Trade Employers	124
Westminster City Council	124
The Student's Column	125
General Building News	127
Sanitary and Engineering News	128
Foreign	128
Miscellaneous	128
Legal:—	
The Southwark Party-Wall Dispute	129
Damage to Property by Subsidence	130
Case under the Workmen's Compensation Act	130
Patents	130
List of Competitions, Contracts, etc.	131
Some Recent Sales	133
Meetings	134
Prices Current	134
Tenders	135

Cambridge and Architectural Education.

A NEW phase of the many-sided subject of architectural education has been brought out in an important correspondence in the *Times* this week. It has been assumed that Cambridge University intended, on the basis of the Report of a Syndicate appointed to consider the subject, to establish a diploma in Architecture. The actual Report we have not up to the time of publication been able to see; but the supposition that a diploma was contemplated elicited a joint letter from three eminent architects, all University men—Mr. T. G. Jackson, Mr. Reginald Blomfield, and Mr. Basil Champneys—criticising the supposed intention of the University authorities for reasons which at all events raise questions that are of interest in themselves.

As we gather from their letter, the Report of the Syndicate assumes that the education of architects in this country is in an unsatisfactory condition (which is only true in a comparative sense—it is in fact in a better condition than it has been for a long time past), and that what is needed is a sound general education on liberal lines, supplemented by special instruction in the principles of construction, in history, and in art. Nothing is said of architectural design. The special examination for the architectural degree is to consist of two parts: Part I. in purely technical subjects (mathematics, applied mechanics, strength of materials, etc.); Part II. to consist of the history of Architecture and the allied arts, an essay on a selected period, and the theory of art in relation to architectural design.

The criticism of the signatories (as we may conveniently term them) on this programme is twofold. In the first place they ask, what has become of the "general education on liberal lines"? And in the second place, how does a knowledge of technical subjects and of history make a man an architect, or prove that he has such accomplishment in architectural design as to merit a diploma? And on their second head Sir Charles Stanford, in another letter, draws a striking contrast between the grounds on which a University degree is conferred in Music and the grounds on which (as has been assumed) it is proposed to confer it in Architecture. He points out that for a musical degree a candidate is required to produce music, and the highest degree is conferred "only upon the merits of completed compositions from the standpoint of inventive power and mastery of expression and design." This seems a striking argument at first sight; but the cases are not quite parallel, because the ultimate end of an architect's art is to produce a building, and he cannot do that for examination, he can only produce a drawing of one; whereas the musician's composition for a Mus. Doc. degree is, as far as he is concerned, the ultimate and complete production; it requires performers to give it voice, but that is not necessarily the concern of the composer; he has done his part, just as much as the poet has done his part when he has written a poem, although it needs the offices of printer and publisher to bring it before the world. There is also the consideration that the architect's business lies not only in inventing a design but in carrying it out in the form of a building of sound construction and suitable for its practical purpose; whereas the man who takes a musical degree is concerned with the production of a work of pure art only, unhampered by any practical considerations. A University diploma in Music certifies that its possessor can compose; though we may suspect that prize compositions, like prize poems, however correct, are often very dull affairs. But a University diploma in architecture would not certify that its possessor was a capable architect; it would, at the best, only certify that he had produced a drawing of architecture which satisfied the examiners. And that is not architecture in the same sense that the diploma composition is music. It is only the presentment of it.

On Thursday morning, in a letter dated from Trinity College, Cambridge, by a correspondent who we may presume to be a member of the Syndicate referred to, it was denied that the Syndicate had recommended any diploma, or that the University contemplated establishing one. Mr. Fletcher states that what the Syndicate have in fact recommended is only "the addition of an examination upon the elements of the scientific and historic bases of architecture to the Pass

Examinations of the University for the ordinary degree." In that case they are proposing to do what we have many years ago proposed and wished for; to give some special encouragement at the University to the study of architecture; not for the making of architects, for architects are not made that way, but for the promotion of a right understanding of a subject of which even the better educated part of the public of this country have mostly no understanding at all. The course of study for the degree, as proposed, is very well calculated to accomplish this object; but that is all. It will only produce intelligent architectural amateurs, not architects.

The threat of the diploma, however, being thus withdrawn, the criticism of the three architects is, so far, beside the mark: *cadit quæstio*. But their remarks on the relation of a liberal education to architectural training are of considerable interest. They speak strongly in favour of such an education as a preliminary to special training. They say that the difficulty which architects have to contend with in the training of their pupils is not the absence of preliminary technical training. "The real difficulty lies in the fact that pupils, owing to their imperfect general education, do not know how to learn. Their faculties are not educated to the fine point which enables a well-equipped mind to seize at once on the essential points of a subject." That is in the same spirit as Mill's famous sentence to the effect that education made a man a better shoemaker, not by teaching him to make shoes, but by giving him the faculty of applying his mind to the best manner of using his materials. And as far as concerns the capability of an architectural pupil to get the best out of the instruction given him we have no doubt that the position laid down is perfectly sound. And yet—the point must not be pressed too far. An architect who has received a liberal education will not necessarily be a better architect than one who has not; the want of such a standard of education will not necessarily prevent a man from being a great artist, either as architect or in any other art. Turner was one of the most ill-educated men of his day; and great designs, and even some great buildings, have been produced by architects who were puzzle-headed in the construction of their sentences and not even always sure of their spelling. As to the influence, therefore, of liberal education on artistic power no certain conclusion can be drawn; it is a subject on which it is not safe to dogmatise.

As to the main point, the proposals of the Cambridge Syndicate; although the letter of Messrs. Jackson, Blomfield, and Champneys seems to have been to some extent based on a misapprehension, it is well that it was written, as it serves to point out possible mistakes and to clear up the subject. If Cambridge is proposing only to promote and reward the intelligent study of architecture, and not to diplomatise architects, their intentions should have the encouragement and appreciation of architects, since anything is a gain which tends to raise the standard of general education in regard to architecture.

THE LABOUR PARTY.

AT the preliminary Conference of the Labour Party which precedes the annual Conference resolutions have been carried declaring that any schemes for Old Age Pensions to be acceptable to that party must be non-contributory and non-discriminatory. Some members of the Government have given utterance to expressions which have been interpreted into meaning that some system of contribution will be required. These utterances have, however, been very vague, and it will be interesting to see if the history of the Trades Disputes Bill will not be repeated in connexion with Old Age Pensions and the Government surrender to the Labour Party. In the speeches of the Labour Members it is always asserted that contribution on the part of the working classes is an impossibility, yet no mention is made of the contributions made by the working classes to the trade unions themselves; contributions to which the unions owe their existence, both in the country and in Parliament. Another point to be borne in mind is the position of the friendly societies, which are supported by the self-respecting sections of the working classes, and which have assisted them in illness with very satisfactory results. These benefit clubs are suffering in funds since the introduction of the Workmen's Compensation Acts. Members in receipt of compensation also draw sick pay, with the result that an incentive to return to work has been taken away; whilst in other cases men refrain from becoming members, trusting to receive compensation without the expense of contributing to any club. Old Age Pensions, if non-contributory, will further injure the benefit societies—societies which reflect the greatest credit on the working classes, and which number those members who have a proper spirit of independence and self-respect. The ideal scheme, both of Workmen's Compensation and Old Age Pensions, would have been one which co-operated with and assisted the benefit clubs, but although it is too late now to revise the system of compensation, it is at least to be hoped that some contributory scheme will be insisted upon if Old Age Pensions become a reality.

At the Conference of the Labour Party recently held at Hull considerable vacillation was apparent in the debates on the question of Socialism. On the second day of the Congress a resolution to amend the constitution of the party by an express declaration as to its policy, *i.e.*, "to obtain for the workers the full results of their labour by the overthrow of the present competitive system of capitalism, and the institution of a public ownership and control of all the means of life," was defeated by 861,000 votes on the grounds that it would exclude the trade unionists who were at present unprepared to accept such a policy. On the third day of the Conference, however, a resolution was proposed, "That in the opinion of this Conference the time has arrived when the Labour Party should have as a definite object the socialisation of the means of production distribution, and exchange to be controlled by a Democratic State in the interest of the entire community, and the complete emancipation of labour from the domination of capitalism and landlordism with the establishment of social and economic equality between the sexes." And this resolution was carried by 514,000 votes to 469,000. The importance attaching to this resolution is the effect it may have on the trade unions. One hundred and eighty-one trade unions were represented at this Conference, and hitherto the trade unions have supported the Labour Party in Parliament, not only by their approval, but by means of a Parliamentary levy made upon their members for returning members to Parliament and maintaining them when there, and these members have been subject to the Whip of the Labour Party. It must be remembered that compulsion is brought upon workmen to join the trade unions, and they are often compelled to do so as the only means of retaining their employment. The union men object to work with non-union men, and employ every means, including strikes and personal violence, to bring members into the union that they may be subject to trade union conditions of work. If the trade unions accept the extreme policy of the Labour Party, the members, by the Parliamentary levy, will be compelled to subscribe to the political policy of the party, and thus the pressure brought to bear upon them will no longer be merely trade pressure but influence of a political nature.

THE GRISSELL MEDAL DESIGNS: STRUCTURALLY CONSIDERED.

AS stated in our article last week, the subject for the Grissell Medal this year is "An Elevated Water-Tank in Reinforced Concrete," designed in accordance with the regulations of the Royal Institute of British Architects.

Considering the comparative novelty of reinforced concrete as a structural material in architectural practice, and the fact that the regulations of the Institute give no assistance to the designer except so far as concerns the proportions of beams, columns, and slabs, the drawings submitted must be regarded as creditable on the whole. But while most of them show an intelligent appreciation of reinforced concrete design, various defects and weak points are evident, which serve to emphasise the lesson that practical experience is all-important to the correct and satisfactory design of structures in reinforced concrete.

The drawings sent in by "Watermark" exhibit an entire absence of knowledge concerning genuine reinforced concrete construction. The tank is of octagonal form, with four massive triangular corners, making a square horizontal section; the tower is square in plan, and the only attempt in the way of reinforcement is represented by steel stanchions and beams with occasional round bars. The shape of the tank and tower, the distribution of the concrete in masses of varying thickness, and the inappropriate use of steel, are all undesirable features of these drawings.

The designs marked "Delta" embody concrete foundations, in which are

embedded rolled steel joists, a very crude and unsatisfactory attempt at reinforced concrete. The superstructure is presumably intended to be reinforced in the correct manner, but, so far as can be judged by the particulars given, the amount and disposition of the reinforcement are anything but adequate. The water-tank is carried by columns with considerable lengths having no intermediate lateral support therefore involving an unnecessary risk of flexure and raising doubt as to the safety of the structure as designed.

"A. B. C.," by Mr. John H. Markham, the Grissell Medallist, is a much better design, where the reinforcement has been well worked out, although the working drawings are not sufficient to show all details of the construction. The Considère system of spiral reinforcement has been adopted for columns and other members, in some of which there would be difficulty in depositing and tamping the concrete between the coils of wire without causing displacement. The beams generally appear to be of rather poor design, and as the main supporting columns are perfectly straight and have no lateral support between the base and the top, their stiffness and stability are somewhat doubtful under the specified conditions.

Several sets of drawings follow more or less closely the design of the water-tower at Newton-le-Willows, built on the Hennebique system, under the direction of Messrs. Read & Waring, of Westminster.

One of the best of these sets is signed "Cottanbique"; the general idea, the disposition of the reinforcement, and the calculations being fully worthy of commendation. Another good design is marked "Stet," but, so far as one can judge by the drawings, the reinforcement is not entirely adequate, and there would be practical difficulties in dealing with some of the spiral coils of wire which are shown. Details of the beam construction are not given in the working drawings, and the foundations are not particularly suggestive of reinforced concrete.

"Homogeneous" is the motto on another praiseworthy design, where the supporting columns are filled in with wall panels. The general idea is good; the columns have footings of suitable character, and the whole structure rests upon a foundation slab. This detail, however, is very thick, being mass concrete rather than reinforced concrete. The design would be much improved by the substitution of a thin foundation slab with longitudinal and transverse beams, all with proper reinforcement, and moulded together as usual in monolithic construction.

"Jack Spratt" is the signature to a design of some structural merit, where the columns have spiral as well as longitudinal reinforcement, the beams are designed on correct lines, and the tank reinforcement is judiciously applied. Some rolled steel joists are incorporated in the work, this being an unnecessary deviation from the principles governing reinforced concrete construction. The entire structure is carried on a foundation of mass concrete which ought to be replaced by reinforced concrete beams connected by a thin continuous slab of the same construction. A good deal of unnecessary material is introduced into the lower part of the structure, apparently for architectural effect. That is bad practice, whether regarded from the æsthetic or the engineering standpoint.

"Delta" indicates a design not particularly suggestive of reinforced concrete, and not giving sufficient detail to enable us to say whether correct principles of construction are embodied throughout the work. So far as shown by the sheet of working drawings, the idea of the reinforcement is fairly good, but, like some of the other competitors, the draughtsman has not taken into account the undesirability of long columns without lateral support.

The design with a nondescript letter or sign represents a tolerably correct appreciation of reinforced concrete, although there is evidently some weakness concerning practical details. The tank is supported on long columns without intermediate bracing or support, and much unnecessary material is introduced into the lower part of the tower. The foundations are good in their way, but could be modified with advantage by an expert in reinforced concrete construction.

Notwithstanding the points to which we have taken exception, it must be conceded that most of the designers have shown considerable aptitude for dealing with a novel method of construction applied to a somewhat difficult subject. The substantial measure of success attained is clearly a hopeful augury of future progress in the adaptation of reinforced concrete to architectural work.

NOTES.

London Water Supply. SINCE the presentation of the Report by the Works and Stores Committee of the Metropolitan Water Board it has been decided that a scheme shall be prepared by Mr. Bryan, and reported upon by experts, for the purpose of providing for additional supplies from the Thames for as long a period as is economically practicable. As this decision was only made about six weeks ago it is quite evident that sufficient time has not yet elapsed for the preparation of a scheme involving the construction of reservoirs, with the ultimate capacity of some 55,000 million gallons of water, to say nothing of investigation by independent engineers. Consequently we must dismiss as entirely conjectural the announcement made in the daily Press to the effect that the project in question was completely drawn up more than a fortnight ago. When the proper time comes we hope to give our readers full particulars of the scheme now in course of preparation.

The Smoke Problem. AMONG other questions discussed by Professor Henry Adams in his Presidential address to the Institute of Sanitary Engineers, the smoke problem very fittingly received attention. The urgency of the matter is emphasised by the reminder that black London fogs frequently raise the proportion of CO_2 from about four parts to ten parts per 10,000 parts, and involve the consumption of extra illuminants to the average value of 2,000*l.* per hour of their continuance. Therefore, sanitarians and political economists have good reason for continuing the crusade against smoky chimneys. Engineers, as Professor Adams suggested, can perhaps do better by devoting themselves to the reform of faulty boiler plants. Two examples quoted in his address are worthy of note. At Warrington, in a factory where the chimney used to emit a large quantity of smoke, the furnaces were altered so that concurrently with greatly reduced smoke production a saving of 1,200*l.* a year was effected. In Manchester, a firm having twenty-three boilers now save 1,000 tons of coal a week, or 25,000*l.* a year, as the result of smoke-consuming furnaces. Figures like these show that increased stringency on the part of local authorities would be true kindness to industrial firms.

The Nore-Gravesend Channel. THE Thames Conservancy Board continue their efforts to improve the Port of London in spite of the general deadlock into which matters have fallen. At the last meeting of the Board it was announced that the whole of the dredging plant for the formation of the new channel, 1,000 ft. wide by 30 ft. deep at low water, from the Nore to Gravesend, had been delivered and set to work. Acting under the advice of Mr. A. J. Lyster, who has done such good work in the Mersey, the Conservancy now possess a 4,000-ton suction dredger which is the largest of its class in the world, and has proved entirely satisfactory in operation. The importance of the new channel is emphasised by the fact that during the past seven years the number of vessels of over 5,000 tons entering the Port has increased more than fourfold. Unfortunately, the net register tonnage for last year showed no increase over the figures for the previous twelve months, a result that ought to stimulate the Government to strenuous action with regard to the main problem of the Port of London.

The Greenwich Boiler Explosion. AN inquiry which has attracted unusual attention is that into the boiler explosion in December, 1903, at the works of the South Metropolitan Electric Light and Power Company at Greenwich. On that occasion two men were killed while in the act of examining one of the thermal storage drums connected with a Babcock and Wilcox water-tube boiler. In delivering judgment the Board of Trade Commissioners found that the primary cause of the explosion was a badly-constructed boiler drum, the immediate cause being the neglect to reduce steam when a crack appeared. The crack actually extended round two-thirds the circumference of the end plate at the time of the explosion, and two days before that event gave notice of its presence by continued leakage. There was a great deal of talk about the defect among the company's officials and the boiler-makers' representatives, but no one seems to have thought of danger; nothing was done to ascertain the cause of the leak, although the boiler was put out of use in the ordinary course the night before the explosion and not coupled up again until two p.m. on the next day. The boiler-makers have been

ordered to contribute very heavily towards the cost of the inquiry, but are really much less to blame than those who persisted in using an appliance which they knew was defective and which their commonsense, to say nothing of engineering knowledge, ought to have told them was in a dangerous condition.

Ludshott Common, Hants.

PROPOSALS are made to collect a sum of 1,800*l.* for the purchase of some common land near Headley and Bramshott on the eastern confines of the county, together with the woodland at Waggoners' Wells, near Grayshott, and to vest the lands in the National Trust as an addition to the open space which was lately acquired at Hindhead, across the border, in Surrey. The wells consist of a group of fish-ponds formed in the XVIIth century by one Wakener, and fed by an affluent of the Wey, which are now separated from the common by enclosed woodlands, which rise from their banks to the open land on a higher level. The woodland on the Ludshott side, and the adjacent common, which extends over some 540 acres, were lately offered for sale. Considerable apprehension is aroused that the piece of wooded slope, if not otherwise secured, will be soon appropriated for building purposes, and that public access to Waggoners' Wells will thereby be forbidden. Moreover, it is felt that the preservation of the common in all its natural unspoiled beauty of fir and heather, hill and valley, and its permanent immunity from illegal encroachment, could be best ensured by placing it in the keeping of the National Trust.

Roman Wall of London: Christ Hospital Site.

IN the course of excavations for the Post Office new buildings on the north side of Newgate-street, a piece of the later Roman wall has been found, together with two rounded bastions, in the northern portion of the ground. That portion formed one of the school playgrounds, and the Blue Coat boys called it "The Ditch." The wall, at about 2 ft. below the surface, is 7 ft. wide, and goes down to a depth of 16 ft. In the ditch along its outer face have been dug up a large number of coins, some bone skates, and old pottery. The Roman wall returned southwards so as to cross Newgate-street a little to the west of Warwick-lane. The wall, in its course eastwards, was uncovered during operations for erecting the Post Office buildings on the west side of Aldersgate-street. It there formed a boundary wall between a row of houses in Bull and Mouth-street and the churchyard of St. Botolph Without, Aldersgate, which now constitutes, with the adjoining burial grounds of St. Leonard, Foster-lane, and of Christ Church, Newgate-street (on the east side of King Edward-street), the public garden popularly known as the "Postmen's Park." In our number of May 5, 1888, we published a description, with a view of the section, and its measurements, of the wall as it then appeared, along an extent of more than 100 ft., with the mediæval wall superimposed above the ground level. The ditch, at one time a moat, and about 75 ft. wide at the surface, was 35 ft. wide at the bottom. On that occasion the Office of Works and the Post Office authorities, at the instance of the Society of Antiquaries, took measures to save portions of the remains from the demolition with which they were at first threatened.

Pevensey Castle.

IN last April were found some stamped Roman bricks of which one bore the impressed letters, "Hon. Aug. Andria," which Mr. Charles Dawson, F.S.A., identified as referring to Honorius, Emperor of the West in 395-423. Recent excavations have resulted in the discovery of Roman bronze coins, mostly of the IVth century, animal bones and skulls of the short-horned Celtic ox (*Bos longifrons*), pottery, and multifarious metal articles, and a well of the Roman period, about 4 ft. square, and lined to a depth of 11 ft. with timber. The fortress which guarded the port of *Anderida* stands upon a craggy steep which the tide once reached; the nine bastions of the main walls consist of solid masses of masonry, and the *Castrum* (whereof a valuable plan by Mr. Figg is in the *Sussex Archæological Collections*) extended over an area of about nine acres. For a time the ruins served as a quarry, and much damage was wantonly inflicted upon the north wall. The beautifully finished and solid nature of the constructional work is clearly illustrated by the set of photographs published in our columns of December 16, 1905, with a description of the details and materials of the masonry. A notable feature of Pevensey is the manner in which the later buildings were engrafted, as it were, upon the earlier fabric, so as to present types of military architecture in two different styles of fortification. There is record of payments made in 1303-4 for repairs of the great and granary towers, the chapel, and the outer ward-gate. The exploration carried out by Charles Roach Smith in 1851-2 revealed the foundations of the nave and chancel of the chapel; one of the Burrell MSS., with drawings by Grimm, in the British Museum, which relates to steps that were taken in 1710 to supply the village with spring-water from the moat, says that the foundation of the ancient wall was found to consist of "piles planked over with slabs of extraordinary substance." In the Castle were imprisoned the Duke of York, *temp.* Henry IV., Henry IV.'s widow, Joan of Navarre, and James I. of Scotland. The lordship, held by Robert, brother of William I., Gilbert de Aquila, and John of Gaunt, was granted by Henry IV. to Sir John Pelham. The property now belongs to the Duke of Devonshire, in succession to the Cavendishes, Earls of Burlington, who derived it through the purchase in 1730 by the Hon. Spencer Compton.

Dublin Municipal Art Gallery.

CLONMEL House, No. 17, Harcourt-street, Dublin, has been reinstated and fitted for the display of modern pictures and sculpture, English and foreign, gathered by Mr. Hugh P. Lane and his co-adjutors, to which Mr. Lane made many valuable contributions out of his own collection. The exhibits, valued at some 30,000*l.*, comprise fine examples of the French impressionist school, purchased from the executors of the late Mr. J. Staats Forbes, with works by Corot, Mencini, Monet, Fantin-Latour, and D'Aubigny, and a fresco by Puvis de Chavannes. There are also paintings by M. F. Lavery, W. Orpen, N. Hone, and J. J. Shannon, Irish artists, and by Constable, Watts, Charles Shannon, Albert and Henry Moore, Clausen, and H. S. Tuke, together with "The Age of Bronze," and four other works by Rodin. The Royal Hibernian Academy and the National Gallery, London, have lent some pictures, and Mr. Lane has been appointed honorary director of a gallery which the Municipality of Dublin owes mainly to his inception and labours. Clonmel House, a fine mansion containing many large rooms, and the home in the XVIIIth century of John Scott, Lord Clonmel, has been acquired by the Corporation of Dublin, who make a maintenance grant of 500*l.* per annum.

Messrs. Tooth's Gallery.

THE important factor in the exhibition now open at Messrs. Tooth's Gallery in Bond-street consists of a collection of a considerable number of the landscapes of the late David Farquharson, whose reputation came to him, unfortunately, only a short time before his death. There are some very fine works among these, which merit more than the half-hearted notice they have received in some of the papers. "Waiting for Darkness" is a grand landscape composition; and among other very fine things are "Ripe for Harvest," a bright study of a high wheatfield and sky; "The Beanfield"; "Ardlin, Loch Lomond"; and the small painting entitled "Full Moon and Spring Tide," evidently a study for the large picture which first brought the artist to prominent notice at the Royal Academy, and was bought out of the Chantrey Fund; a purchase which, at all events, was no misapplication of the Fund.

Some Mezzotints.

THOSE who cannot afford pictures, and like to beautify their walls with productions of the fine and less costly art of mezzotint, should look at the collection of mezzotints by Mr. Norman Hirst, at Messrs. Dowdeswell's Gallery. Not only is Mr. Hirst very successful in his engraving in this medium after existing pictures, but his own original subjects in mezzotint, the landscapes especially, have very high merit.

MISSION-HALL, NEWCASTLE.—The Mission of the Holy Spirit in Spring Garden-lane, Newcastle, was opened on the 14th ult. The new building contains a mission-room in the basement, about 80 ft. long by 40 ft. wide. At the rear is a choir gallery, and at the other end a small chancel, with a plain oak altar, and a stone pulpit at the left. The room is heated by a hot-water system, low pressure, supplied by Messrs. R. J. Ward & Co. Above the mission-hall is the clergy house. There are also class-rooms. On the second floor is the dining-room, with kitchen, scullery, and a spare bedroom. On the third floor are the housekeeper's room, bedrooms, and bathroom accommodation. The buildings to the first floor are faced with ashlar, and above there is red-pressed brick, with stone dressings. The architects were Messrs. Boyd & Groves, of Newcastle; and the contractor was Mr. Alexander Pringle, of Gateshead. The sub-contractors were:—Plumbing, Messrs. J. Wilson & Co., Low Friar-street; painting, Messrs. Merrilees & Denton, Gateshead; electrical fittings, Messrs. T. G. Usher & Co.; block flooring, the Turpin Wood Block Company, London; lead-glass, Messrs. Davison & Walker, Newcastle.

THE AQUEDUCTS OF ANCIENT ROME.—IV.

By Dr. Ashby, Director of the British School at Rome.

Almost due east of the railway station of Castel Madama two streams, the Fosso Maiuro and the Fosso Ariana, unite and soon fall into the Anio. They are crossed just below the point of junction by a long stretch of aqueduct,* over 200 metres in length, in concrete; it is constructed in two horizontal sections, with small arches in the lower section and buttresses from top to bottom (Fig. 4; *Plate*). It requires careful measurement and study, which I have not yet been able to devote to it.

There is another bridge lower down the stream, but at the same level (belonging, therefore, probably to the Claudia), constructed of brickwork with buttresses, huge masses of which have fallen, and some masonry in *opus quadratum* at the actual crossing of the stream (Fig. 5; *Plate*). Of the Marcia and Anio Vetus I was unable to detect any traces.

To the north of the village of Castel Madama another stream, the Fosso della Noce, descends to the Anio; and here again we have a fine bridge of the Anio Novus, with ornamental cornices in brick; that of the Claudia has almost entirely perished.

Remains may again be seen at the crossing of the stream which passes to the west of the village of Castel Madama. The bridge of the Anio Novus has fallen; that of the Claudia, however, is still well preserved, the channel being still intact. It spans the stream by a fine arch, with two lateral arches in concrete. The bridge of the Marcia in *opus quadratum* has, to a considerable extent, perished; while the Anio Vetus can only be traced by a heap of aqueduct deposit close to the Anio, which must, it would seem, belong to it.

The aqueducts now follow the curve of the river round the north end of the Colle Papese. On the west side of it they separate, the Anio Novus and the Claudia passing through the depression going due south, and then tunnelling to reach the broad valley of the Fosso d' Empiglione, while the other two continue to follow the curves of the river; the channel of the Anio Vetus only appears at two points, in the first it is 92 cm. wide, with a fairly heavy deposit; it is built in masonry of tufa, the blocks being 50 cm. thick; while at the second it is a later restoration in concrete. The Marcia only appears once.

The Claudia and Anio Novus, after arriving in the Valle d' Empiglione, separate at right angles. The former runs straight on (*i.e.*, due south) and crosses the valley by a fine series of arches, about 800 metres long. They were originally built in *opus quadratum*, but were later on strengthened with concrete faced with brick and *opus reticulatum*. The highest portion, at the crossing of the stream, is 25 metres in height; here massive buttresses have been added to the original construction. Fig. 6 (*Plate*) gives a view of this portion; while Fig. 7 is a view from the south end along the line of the aqueduct, and shows the original masonry appearing in the midst of the later work. Canina (*op. cit.* tav. 143) gives drawings of the central portion, in which he gives no indication of the original structure, though he mentions it in his text (v., p. 145). After passing through a short tunnel the aqueduct reappears, and here is the only case (drawn by Canina, tav. 144) of a bifurcation of the channel—the straight and original branch being the older, while the later arm turns several times. It was either a repair effected in the channel without interruption of the flow of the water, or else, as Lanciani thinks (p. 349), intended as a discharge for the water, in case the long tunnel into which the aqueduct shortly enters needed cleaning.

At this point the altitude of the *specus* is 255·70 metres above sea-level; the fall in 2,300 metres was measured by Lanciani as 75 cm., giving a fall of about 1 in 3,066. Its substructures are, however, traceable a little further southward than Lanciani indicates, so that the length of the tunnel is not 4,950 metres, calculating the distance to the Ponte S. Antonio, but about 600 metres less.

The *specus* was, too, apparently discovered in 1703 near Gericomio, some 1,300 metres north of the Ponte S. Antonio, and found to be only a little way below the ground level; for Lanciani quotes Cassio as* stating that its roof fell in, and that it was found to be 2·67 metres high by 1·56 wide; so that the tunnel was not continuous.

It has generally been supposed that this tunnel formed no part of the original plan of the aqueduct, for it is referred to in an inscription (*C. I. L.* xiv. 3,530) as having been completed in 88 A.D. The text is as follows:—*Bonae deae sanctissimae caelesti L. Paquedius Festus redemptor operum Caesar(is) et pupli-corum aedem diritam refecit quod adiutorio eius rivom aquae Claudiae August(ae) sub monte Aeflano consummavit imp(eratore) Domit(iano) Caesar(e) Aug(usto) Germ(anico) xiiii co(n)s(ule) v. non(is) iul(iis)*, that is, To the Bona Dea, most holy, heavenly, L. Paquedius Festus, contractor for imperial and public works, repaired her ruined temple because by her help he completed the channel of the Aqua Claudia Augusta beneath the mons Aeflanus, in the XIVth consulship of the Emperor Domitian Cæsar, Augustus, Germanicus, on July 3 (88 A.D.).

The inscription is said to have fallen from, or to have been actually found upon, the summit of the Monte S. Angelo in Arcese, a lofty hill which lies to the west of the line of the aqueduct, upon the summit of which there are remains of a mediæval church and convent, into which have been built what may be fragments of the temple. The provenance of the inscription is, however, not certain. It was at S. Gregorio when it was first copied, in or about 1600 (*Papers of the British School at Rome*, iii. 133†).

It would seem, therefore, that before 88 B.C. the Aqua Claudia must have followed the course of the other three aqueducts; but the question of its length, as before remarked, is a difficulty (*supra*). Scanty traces of its original *specus* are, however, to be found along this line. It appears, as Lanciani points out (p. 347), that the first channel was hastily executed; for the inscription of Vespasian (*C. I. L.* vi. 1257) on the Porta Maggiore, where the aqueduct entered Rome, states that he, in 71 A.D., restored the aqueduct which Claudius had constructed, and which for nine years had been out of use and ruined; and this shows that the original aqueduct can have been in use for ten years only. It is still more noteworthy that his son Titus, ten years later (in 81 A.D.), describes Vespasian's work as already in ruins (*vetustate dilapsae*) especially near the springs, so that a new channel had to be constructed. We do not hear of any similar trouble with the Anio Novus, and the problem is a difficult one. It may be that the Claudia followed the Anio Novus very closely, round to Tivoli, and used the same arches before the tunnel was made in 88 A.D., which avoided this portion of its course.

The Anio Novus, on the other hand, keeps on the north side of the valley of the Fosso d' Empiglione, its direction changing from south to west; at first it runs along the ground level, but is soon carried over a depression by a line of brick arches 230 metres long, which are remarkably well preserved (see Lanciani, *op. cit.* 354), and then travels along the surface of the ground once more, its line being marked only by the hard masses of deposit which had reduced the width of the channel by at least one-half, and which still resist the destruction which has overtaken the brickwork of the channel itself, and then reappears on arches at the crossing of the Fosso degli Arci, formed by the union of the Fosso di S. Gregorio and the Fosso d' Empiglione. The arches at the stream itself were the loftiest in the whole course of the aqueduct, and are mentioned by Frontinus as reaching the altitude of 109 ft. (32·5 metres). The original construction was in *opus quadratum*, but there have been extensive restorations in brickwork, which give the main pier, now preserved on the left bank (for the portion which actually crossed the stream has entirely disappeared, and against this pier only the impressions of the original blocks of stone remain), a total thickness of nearly 9 metres. The restorations, in fact, date from the end of the first or the beginning of the second century, to judge from a brick-stamp recorded by Fabretti as found three miles above Tivoli in the arches of the Anio Novus (*C. I. L.* xv. 2382 a). There are also remains of the bridges of the Marcia and Anio Vetus; the substructures of the former may be traced on the left bank, where they are of the time of the Empire, while a portion of the original aqueduct (which, though smaller than that of the Anio Novus, must have been of very considerable length and height—Lanciani (*op. cit.* 290) calculates the former at 218 metres) may be preserved, consisting of an arch and its piers in *opus quadratum*, partly masked by later concrete (on the right in Fig. 8, the Anio Vetus being on the left). The bridge of the Anio Vetus was independent, and, though very close to that of the Marcia, at a slightly lower level; it retains no traces of its original construction, being entirely in concrete. Alongside of it was a bridge for the ancient road which followed the aqueducts from the Valle d' Empiglione. The channel passes under the arch of the Marcia, which still stands on the left bank.

From this point all three follow the line of the road to Tivoli, the Anio Novus keeping some way above it, and having a line of several arches over a lateral valley. Traces of them have appeared in the town of Tivoli itself, for they did not tunnel the northern extremity of the Colle Riboli, but ran round it.

With their abandonment of the course of the Anio, which now abruptly descends to the level of the Campagna by the well-known falls, the first section of the aqueducts ends. In Roman times, too, this section was treated separately, and went by the name of "superior pars" in the time of Frontinus. Lanciani (*op. cit.* 355) quotes three inscriptions which he thinks may have reference to this portion of the aqueducts; but the interpretation of the abbreviations in the first (*C. I. L.* vi. 777) is uncertain, the second (*C. I. L.* xiv. 3,682) from Tivoli, *C. Terentius Valens praef(ectus) rivi superu(atis)*, may refer, and perhaps more probably does, to an aqueduct which was the property of the town of Tivoli, while the third (*C. I. L.* vi. 3,865-31,945), which records repairs to the Anio Novus executed in 381 A.D., was found upon the Tiber Island, and there is nothing in its text to indicate the part of the aqueduct to which it refers.

After turning the north extremity of the Colle Riboli, the aqueducts (with the single exception of the Claudia) follow its western slopes, keeping along the line of the road to Gericomio. A *cippus* of the Anio Vetus (No. 901) was found here, *in situ*—of No. 932, the highest number known of this aqueduct, the findspot is not given (*C. I. L.* vi. 31,558, g, h). So was also No. 816 of the Marcia (*Not. Scav.* 1892, 52—omitted in *C. I. L.*)—a discovery which shows that the original course of the Anio Vetus was even more tortuous than that of the Marcia.* The channel of the Anio Novus has been found at several points in the cellars and in the gardens of the villas on this side of Tivoli, and it also traverses a large *piscina* known as Grotte Sconce, which probably served as a clearing tank. It has three chambers, and

* Lanciani, *op. cit.* 349 *init.*

* *Corso delle acque* i. 14.—I cannot verify the reference.

† I may take the opportunity of correcting a mistake I then made. The inscription is not now preserved at S. Gregorio, but a part of it is in the Palazzo Barberini at Rome, the rest being lost.

* No. 823 of the Marcia and another broken *cippus* lacking the name of the aqueduct to which it belonged, but bearing the number 803, and so being probably a *cippus* of the Marcia also, have been copied at Tivoli, their provenance not being exactly known (*C. I. L.* vi. 31,562 a, 31,570 c).

is trapezoidal in plan (for the plan see *Papers of the British School of Rome*, iii. 194).

A mile further on are the substructures called the Arcinelli, which Lanciani describes (*op. cit.* 356).

The channels of both the other two aqueducts can be traced at a slightly lower level, running along the same slopes. That of the Marcia, 0·88 metre in width, constructed in brickwork, may be seen just below the *piscina* of the Anio Novus*; while that of the Anio Vetus, in places cut in the rock, in places constructed of big stones roughly mortared together, 1·35 metre wide by 1·25 metre high (Fig. 9), runs a little lower—for the most part below the road. Its substructures at the Arcinelli, lower down than those of the Anio Novus, are planned by Lanciani, *op. cit.* tav. i. 5. The material in use is concrete, reinforced by buttresses of *opus quadratum*.

Herschel (*The two books on the water supply of the city of Rome of Sextus Julius Frontinus* Fig. 9) gives a photograph of the exterior of a cistern which he attributes to the Anio Vetus. It is, however, a view of the south end of the lower terrace of the so-called villa of Fuscus, showing the entrance to the vaulted substructures (cf. Dodwell, *Views and descriptions of Cyclopean Remains*, pl. 125, 126; *Papers of the British School at Rome*, iii. 195), whereas the cistern is as a fact in the upper terrace, and therefore, as stated in *Papers, cit.*, level with the lower platform. The cistern is, too, not a large one, consisting of two chambers, 2·40 and 2·60 metres wide respectively, and 5·80 metres in length—too small altogether for a clearing tank of the Anio Vetus.

Some distance further on to the south of the road the Fosso di Ponte Terra was crossed by a bridge, two piers of which only remain, which may possibly have belonged to this aqueduct. The course of it is, however, not quite certain at this point. The other two kept on in a south-easterly direction until they reached Gericomio,* where, as we have seen, the Claudia rejoined them, and then proceeded due southwards. Inconsiderable remains are to be seen in two small intermediate valleys, and, a mile south of Gericomio, the first of the great ravines which the aqueducts have to traverse between this point and the Via Praenestina is reached—that of the Fosso dell' Acqua Raminga. It is spanned by the Ponte S. Antonio, a fine bridge in masonry, strengthened subsequently by concrete faced with brick.

The central arch is shown in Fig. 10. Canina (*loc. cit.*) and Lanciani (*op. cit.* 259, 291) attribute it to the Anio Vetus originally, the concrete having, they suppose, been added when the Marcia was constructed. There is, however, close to it, and some 30 ft. or 40 ft. lower, another bridge, much smaller, in *opus quadratum*, with a single arch, strengthened later by brickwork, which should perhaps be attributed to the Marcia. The channel seems to be 1·30 metre wide. In that case the Ponte S. Antonio carried the Anio Novus and Claudia, though only one channel is now visible, as is noticed by Canina (*op. cit.* vi. 144). It is of *opus reticulatum*, with pointed roof, only 80 cm. in width, and somewhat heavily incrusted, so that it may be attributed to the Anio Novus; it is running at right angles to the bridge, and must have turned sharply to run over it. We shall meet with this peculiarity almost without exception in this portion of the course of the aqueducts, the object being to diminish the rapidity of the flow of the water as it passed over the bridge, so as not to put too much strain upon it.

Of the Anio Vetus I have not been able to detect any trace in this valley.

* In the first portion of its course, just after the divergence of the upper road which runs to S. Gregorio, its channel avoids a tomb cut in the rock, which must, therefore, be of even earlier date (*Papers, cit.* 193 n.).

* Canina, vi. tav. 142, represents their course incorrectly, owing probably to his erroneous view about Ponte S. Antonio. A certain Don Silvestro Petronselli, archpriest of S. Gregorio, a correspondent of Revillas in 1739–44 (*Papers, cit.* 132 n. 3), came far nearer the truth.

LETTER FROM PARIS.

On Tuesday the 11th is to be inaugurated the monument raised by public subscription to the memory of Scheurer-Kestner, former Vice-President of the Senate. This work, of which the model had been completed by Dalou shortly before his death, has been completed by his favourite pupil M. Becker, who is also completing, for the Petit Palais, the large relief in marble of "La République," the model of which was purchased by the Paris Council from the Salon of 1883. The new monument stands in the Luxembourg garden. It consists of a stele decorated with a medallion portrait, on each side of which is a figure; one draped, personifying Justice, the other nude, symbolising Truth.

Another attempt at theft—fortunately unsuccessful—has been made at the Louvre, by some persons who attempted to gain an entrance to the Galerie d'Apollon by the balcony of the window known as the "fenêtre de Charles IX." As this gallery contains some of the greatest treasures of the Louvre, further precautions are to be taken in regard to it.

The building of the ancient Hôtel Dieu, in the Rue de la Bûcherie, is at length to be demolished. On the site it is proposed to erect a new building for the Ecole des Arts Decoratifs. One good consequence of this demolition will be to open out to view the ancient church of St. Julien-le-Pauvre, which, thus disengaged, will be surrounded

Fig. 10. Ponte S. Antonio.

by a small open square. Not far from this is the church of St. Séverin, now also nearly built up by old houses, which in their turn are to be removed, so as to bring the church into view.

The Conseil-Général of the Seine is considering a scheme for quicker and more direct communication between Paris and the Forest of Saint-Germain. According to this scheme, a boulevard 50 mètres wide is to be formed as a prolongation of the Avenue de Neuilly, with an electric railway line in the centre, and a carriage road and foot walks on each side. This boulevard, which will cross the Seine at Nanterre, will be some 13 kilomètres (nearly 8 miles) in length. The total cost of the operation is estimated at 33½ million francs. The author of the project, M. Franck, an engineer, proposes to build artisans' dwellings ("habitations à bon marché") along the line of the boulevard.

The system of entrance to the public museums by payment is to be commenced on the 11th inst. at the Petit Palais and at the Carnavalet, the Cernuschi, and Victor Hugo Museums. The system is not to be extended to the Musée Galliera, as this is not considered as a museum in the ordinary sense, but as an exhibition gallery put gratuitously at the disposal of artists.

We have to record the death of an artist of talent and whose loss is much regretted, M. Emile Dameron, who has died at the age of 59. After having studied under Albert Maignan, Leloir, and Lerolle, he became a pupil of the landscape painter, Pelouze. His earliest works were devoted to illustrating scenes in the environs of Paris. He had received medals at various Salons, as well as the Cross of the Legion of Honour. Among his works may be mentioned "La Cabane du Bûcheron dans les Bois de Cernay," which is in the Luxembourg Museum.

COMPETITION FOR THE NEW Y.M.C.A. BUILDING IN MANCHESTER.

THIS competition, which was limited to four Manchester architects, was really decided upon some time during July last year, but the result has only recently been made public. In the interim the selected architects, Messrs. Woodhouse, Corbett, & Dean, have been so revising their scheme as practically to render it a new design altogether, with the somewhat curious result that simultaneously with the announcement of the competition result there is published in the *Guardian* a view of a building entirely different from that which is exhibited as having obtained the assessor's approval.

Peter-street, in Manchester, where the new building is to be erected on the site of the existing Y.M.C.A., was not, many years ago, the most imposing street in the town. The Free Trade Hall, Theatre Royal, Y.M.C.A., and the Gentlemen's Concert Hall were a range of dignified and harmonious buildings, and St. Peter's Church tower on the opposite side was one of the most characteristic landmarks in this part of the city—whether seen from Oxford-road or Deansgate, or terminating the fine vista down Mosley-street. St. Peter's Church has been pulled down for apparently no cause whatever—the western tower one would think might at any rate have been spared; the Gentlemen's Concert Hall, good acoustically and simple and dignified in external treatment, has been replaced by the Midland Hotel, about which nothing further need be said; and now the Y.M.C.A., a quiet stucco building of Grecian type, is to be superseded by an erection which has been designed to harmonise with the Midland Hotel on the one hand rather than with the Theatre Royal on the other. The advice in the conditions that the competitors should have an eye to the Theatre Royal and Free Trade Hall in the treatment of their façades seems to have escaped their notice.

Mr. Thomas Worthington, the assessor, can have had little hesitation in placing the scheme submitted by Messrs. Woodhouse, Corbett, & Dean first, as their plan is the only one which shows any real grasp of the problem, which was difficult enough; the new building comprises swimming-bath, gymnasium, running track, Badminton and fives courts, large hall to seat 1,000, lecture hall to seat 150, and innumerable other rooms, including a large junior section. In the selected design the gymnasium and swimming-bath were placed in close proximity on the top floor, and this seems the only possible arrangement. The plan, however, can hardly have suited the Committee of Management, seeing that the architects have been called upon to modify and re-arrange it in its entirety.

With one exception the competition elevations were all of the commonplace three-quarter Ionic column and bulge-frieze type. The exception was a Byzantine design submitted as an alternative by Messrs. Woodhouse, Corbett, & Dean. This design has the merit of escaping the commonplace, but the minute surface ornamentation round the name plate would be lost at the height of 40 ft. from the ground, and the curious and rather ugly blocks to the turrets are unfortunate. For the rest, although Byzantine is undoubtedly a Christian style, this design does not seem to typify the object of the building (one of the conditions laid down), nor for that matter do any of the other designs submitted, which might equally well do duty for insurance offices. Perhaps the existing Grecian façade can hardly be called Christian, but at any rate it seems to carry out the precept "Study to be quiet."

The design which has recently been published by the *Manchester Guardian*, representing the wishes of the Committee of Management, falls very far short of the same architects' competition design, commonplace though the latter was; its grouping is haphazard and its outline unsatisfactory. We hope before finally adopting this design that the Committee will call to mind their twofold injunction, that the building is in the same street as the Theatre Royal and the Free Trade Hall, "the latter a building of monumental character," and that it is for the Y.M.C.A.

THE ARCHITECTURAL ASSOCIATION.

AN ordinary general meeting of the Architectural Association was held on Friday last week, at No. 18, Tufton-street, Westminster, S.W., Mr. Walter Cave, President, in the chair.

The minutes of the last meeting having been read and confirmed and some nominations read,

Mr. Maurice Webb, hon. secretary, announced that the Architectural Association play, entitled "Metopomania," would be held at the Georgian Hall, Gaiety Restaurant, on Wednesday, February 26, Thursday, February 27, and Friday (members' smoker), February 28, at 8.30 p.m. Tickets may be obtained at the offices of the Association.

The following gentlemen were then elected as members—*i.e.*, Messrs. H. French, of Preston, near Hull; J. L. Howe, of Northwood; A. F. Morley, of Northampton, and S. E. V. Tattersall, of Acre-lane, S.W. The President announced the re-instatement of Mr. A. R. Jemmett.

Members' Successes.

The President said he desired to make a statement about a very satisfactory and an almost unique occurrence—*i.e.*, the many Architectural Association prize-winners in the recent Royal Institute of British Architects' prizes and studentship competitions. There were so many successful Architectural Association men that he thought some recognition of the fact should be made, and he proposed to read the names of those who had obtained honours, *i.e.*—

The Soane Medallion and the Tite Prize to Mr. G. Drysdale.
The Essay Prize to Mr. P. M. Stratton, and a certificate to Mr. Hill, B.A.
The Arthur Cates Prize to Mr. Bryan Watson.
The second place in the Pugin Studentship to Mr. A. Winter Rose.
A certificate of Hon. Mention in the Pugin Studentship to Mr. N. W. Hadwen; and
The Grissell Gold Medal to Mr. J. H. Markham.

The President added that he thought it was a matter for congratulation that the Association members should have obtained eight places in the honours list.

Stained Glass.

Mr. J. Dudley Forsyth then read the following paper on "Stained Glass":—

"Mr. Chairman, the subject of stained glass is one which has so often been dealt with at meetings of this kind that there seem to be many difficulties in the way of him who would desire to strike out on a new line and treat it in a way which is void of repetition and abounding with fresh information of interest. I must confess therefore that when your Council kindly invited me to give you a paper to-night it took me a long time to decide upon what course to travel and how to render something of interest. On former occasions when I have visited meetings of this Association and those of similar institutions it has always occurred to me that the success of the evening really depended on the discussion which followed the paper, where the views of others were given and points were argued; and it seemed to me that the more holes there were to be picked in the paper, the greater was the success of the evening, for the discussion and argument about them produced considerable benefit which otherwise might have been lost. Therefore the decision I came to regarding this particular paper was to treat it in such a way as to try to secure a good discussion. The line taken is not so much to deal with the technique of glass or with the traditional side of it, but chiefly to submit my own views in a few ways upon the subject.

In all the applied arts one rule obtains, namely, that each is governed by its respective material, and any unwarranted attempt to stray beyond the limits of material must consequently be wrong. This rule applies to stained glass as much, if not more, than to any other craft, and a brief reference now to its materials and the possibilities which are opened up because of them may help me presently in a few opinions I wish to offer. We have at the present day the greatest assortment of material that has ever been known, and in the bulk that assortment may be considered legitimate material for the purpose it is put to. The glass blowers have given us a great many very beautiful specimens of material which have never been equalled for richness of colour and brilliance of texture. There is practically no limit to the scope offered to the colourist in the selection of material for his work. The different kinds are well known to you, and I need not enumerate them; they are mostly prepared to receive pigments used by the glass painter, but some are made to be used in windows without treatment other than the leadwork. Great progress has been made also in methods of glass painting which nowadays is being brought to a pitch of excellence and is greatly superior to much of the earlier glass painting, when all expressions were portrayed in the same way with a crude, heavy line (I refer to the bulk of Church work of the Gothic style), and the up-to-date processes, shading with a flat mat, water stipple and oil tone, fine brush work and needle-point to produce strong or delicate tones, half-tones, and shadows are, in my opinion, sound and legitimate methods. I consider also that enamelling to a certain degree is permissible and correct and should be allowed to be classed under stained glass. With all these advanced methods and splendid materials, great possibilities are therefore open, and opportunities are offered in nearly all instances where a treatment of a window in stained glass is required of producing something which to a certain extent should be unlike any in other buildings.

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The architectural and other conditions demand that they must be different. There can be no mechanical rule by which a window is to be coloured—it must be coloured and treated strictly in accord with the requirements of its situation, and those requirements are never twice alike. It therefore follows that to execute twelve windows exactly alike from the same design and send them, because they happen to fit to spaces allotted to them, to twelve different buildings is to make an obvious blunder. A window must be designed especially for the space provided for it. There are several fundamental points in all buildings which govern the design for a stained glass window, and the most important are—aspect, scale, and style, and it is essential that the designer be acquainted with them, making studies and notes in the building. The designer very often knows nothing about these.

I have so often thought that designers of stained glass do not give sufficient consideration to the architectural side of the subject, and I am quite convinced in some cases they have given none.

Windows, as regards their masonry, play a prominent part in architecture and are usually most important features in the architect's scheme, and it should be the endeavour of all glass designers to attempt to imagine what ideas in construction the architect had concerning them. If he is at hand and can be consulted, so much the better; but if it be an ancient building which contains them, then the glass man is left to his own resources, and if he views the subject correctly he will find that the masonry of the windows tells its own story, how obvious points of symmetry, scale, proportion, and general utility were all intended by the architect who thought them out.

That his conception of their forms came about by requirements of the building so that they might very materially assist as features in giving dignity of proportion and scale in its details. It cannot be denied therefore that these things must be very thoroughly thought out before any decoration in glass is applied to the masonry, and when they are thought out and a correct basis found upon which to build up a design, the question of aspect and scale in subject and masses of colour is the next point the designer has to think of. There are some windows that show that the architect designed especially for receiving stained glass, others where he intended it should be used very sparingly; all these points must be evident to the glass man before he can make a success of his part, and as the art of stained glass is the most vivid form of decoration, the treatment of it should be bound down by correctness, etc.

The designer should where possible take his lead from the architect, whose directions should be somewhat definite about them, for it is in his province to instruct in a general sense on matters of scale in figures and massing of colour and the quality of it desired. Given, then, that the main characteristics of the design have been decided upon, there remains the making of the window itself, and here the enthusiastic and conscientious worker commences what really is a fascinating and interesting occupation, but he is a genius who does not encounter trouble before he has gone very far with his work. Sometimes he apparently asks for it, and in a technical art of this kind it is very easily found. I refer to the difficulties of colouring. If the designer does not actually select and mark out his shapes on the coloured sheets of glass, I contend that his work will most assuredly go wrong, and for this reason, that although the cutter may be well up in his work, and may have very thoroughly classified his material in numbers and letters, it is not possible that he can know the ideas and intentions of the designer concerning them.

Moreover, it is equally difficult for the designer, notwithstanding his experience in matter, to mark the shapes on his cutline with the letter or number, with any feeling of certainty that his selection, combined with the cutter's skill, will be found successful. The designer must see to this himself, for in working his original coloured sketch scheme the kinds and qualities of the material were uppermost in his mind, and he alone can choose them. Again, colours and tints in glass are considerably affected by each other, and to render the value of them in their proper places telling and good, each must be chosen with due regard to and by the test of others; it should always be borne in mind that glass looks one thing on the bench or when viewed in the sheet, but quite another when it takes its place amongst hundreds of other pieces and is seen in the window. I have dwelt on this part of the process rather more than I had at first intended, because it really is most important, and before I leave this stage of my paper which is descriptive of the making of a window I would like to make mention of another point which, in my opinion, is still more important, and it is that of drawing.

Everything in a window should be well drawn, and as often as possible models should be employed to assist the draughtsman in his work. Figures, no matter how far they have to be conventionalised, must be studied from life, as without it inaccuracies are bound to appear. It is distinctly wrong for the draughtsman to draw something which only suggests a figure, because the material demands a true and decisive line, and the figure has to be clearly defined. Such effects in nature as concern truthful proportion, anatomy, and graceful lines can most certainly be felt in all decorative work, and glass is no exception. It is surely wrong to draw a whole lot of lines which are intended to denote drapery with the object of pretending there is a figure hidden away somewhere in it, and to be informed on inquiry that it is Gothic.

It seems to me that bad composition and drawing often escape in windows with an excuse of this kind. The technique most certainly does not prohibit good drawing, for delicate lines and the softest effects can be and ought to be portrayed in their proper places. I fail to see why the expression in faces is stereotyped, why figures in glass are hideous and have heads and other appendages very much too large or too small for their bodies, why the drapery with which they are clothed should suggest gas-pipes or corrugated-iron. I am frequently being told where to see the finest old glass in this country, and I have invariably found on inspection that this glass which is generally early Gothic contains the most glaring mistakes and abounds in the unfortunate errors I have referred to. My informant in each case just missed the subtle reasons why this glass was of the finest. I could have told him on each occasion that in this glass the drawing was decidedly bad, the colouring extremely elementary and poor, and the subjects treated in a grotesque manner; but, as I was seldom invited to do so, I left well alone. We obviously viewed this old glass from two very wide standpoints. My own was to view old glass on its merits and from the technical side. The other viewed his certainly not in this way, but as I am convinced in a biased way, accepting much that he could not account for, and blindly following what has been so often taught and what unfortunately is so widely accepted—that old glass as an art, no matter whether it be the best or worst of its period, is by far the finest of the stained glass in this country possible to behold.

Now I take exception to these theories which are so freely quoted about old glass. The hall-mark of age does not necessarily stamp everything as excellent, and in this particular art there are many points which, if he were expert, the antique enthusiast would not catalogue his XIIIth-century glass as being on an equal footing with other architectural enrichments of the same period. And this can be accounted for in great measure. In those times they had neither the material nor the experience, and in consequence worked considerably in doubt and were handicapped in their processes and methods. It is interesting to notice how very much more expert were the workers of that period in other crafts. Their carving of ornament, for example, was most beautiful, and the way they handled a cap or spandril was very clever. I think many will agree that the carving of the XIIIth century was never surpassed by the two succeeding periods of Gothic. It was exquisite in design and finish, and most cleverly managed and applied, and is one of the best examples of the use of ornament in architecture. Yet in glass, as in other crafts, they were conscientious, and utilised what they had to their best ability, and although, from my point of view, the artistic side suffered, the groundwork of their system was most correct. They knew what a window was for and knew how to treat it. If their drawing, colour, and composition were at fault, they were faults on the safe side, for figures and groups of figures—not so much colour—were made to be less significant than construction in the design and the leading of it. Figures were always very small, and they seemed to be a mere filling in panels of various shapes, and were surrounded by heavy ornaments. They cannot be said to fulfil the requirement of figure subjects in a window.

They were apparently part of the ornament, which was the chief characteristic in XIIIth-century glass, and did not form any prominent and distinctive feature in the design. This developed and was felt in later times.

What we must all appreciate in old glass is the way it was applied, for it was undoubtedly architectural, the difficulties under which the craftsmen laboured and how well they were overcome. The correctness of old windows lay in their flatness. The conventionalities and crudenesses in design, owing to limited scope, accounted happily for a sound architectural treatment of what really is a structural surface which has the same relative value in the building as a wall. We are reminded of the various phases through which it passed. It appeals to our sentiment to admire it, the quaint effects in forms and in the confusion of its patched-up design, as we view it to-day, the mellowed tones in colour caused by decay, corrosion, and vegetable growth on its surface, all tend to attract the attention, and to the canvas painter these effects are glorious. But its chief value, if considered to be the finest art in this country, lies in its actual substance as being a relic of the past and a specimen of its period; and this we are most glad to have with us and to preserve.

To see old glass in a more advanced state one has to go to the continent, where, in cathedrals, churches, civic halls, and museums, it is to be seen in great quantities.

In the Middle Ages, when the artist was plodding away at his work which had become so mannered the foreigner was striking out in all directions for novelty, and ambition is written largely all over his work. He took a much wider view of the subject and brought into play methods and ideas to treat it in a more ornate, pictorial, and finished style. What he did was very clever indeed, but often signally failed, for there are many instances where, in my opinion, the foreigner undoubtedly went wrong, and in comparison with his work and that of the Englishman there is a peculiar contrast. He was in these instances more advanced in conception of design, drawing, and colour, but failed in constructiveness and application, whereas the Englishman, lacking the former qualities, certainly excelled in the latter.

To support this opinion there are several examples I would like to refer to, but will take one only as being sufficient, and it will

also serve to show what should be avoided in glass design. I allude to windows which are very historical, very well known, and which are repeatedly being held up to me as being amongst the finest glass in the world, namely, the large Gothic windows at Gouda in Holland. I consider these windows altogether wrongly constructed. They seemed designed purposely to ignore the architecture of which they really ought to be a subordinate part. The masonry of these windows consists in each case of several long narrow lights with mullions of delicate construction, a style typical of its period, dignified in its proportions, and obviously designed by the builder to emphasise refinement and other specific reasons in his building. But the decoration which fills them takes quite an independent attitude; it appears to have its own axe to grind, is overpowering, and fulfils a different mission to what, judging by conditions, it is invited to do. Instead of the long narrow lights receiving a treatment of a flat decorative type, each of uniform depth and tone, the whole contour of the window is utilised to serve one main straggling pictorial subject, and the result is an unfortunate interruption of the window-plane. We see great painted scenes which practically render in effect an aperture through which the eye travels to scenery, houses, villages, battles being fought, and all kinds of impossible incident. Large masses of colour appear without balance, and these, with figures varying in scale, run anyhow through the mullions. Thus is conveyed the impression that the designer would have liked to cut away all the mullions and tracing and leave himself a clear field, for no doubt from his point of view they did cut up and interfere with his design. There is something radically and technically wrong with the design for a window when it invites one to feel what a pity it is the architecture is there and how much nicer the glass could be if nothing of the kind were there to interfere with it.

Extravagant effect in perspective such as are seen in these windows are, I contend, a great fault in glass. In architectural features such as canopies perspective should be very slight, more especially where they fill out the windows completely and seem attached to the masonry. These should be drawn more as an architect would draw an elevation, and they would then be more strictly speaking glass canopies and not representations in glass of masoned and carved canopies. Perspective is less incorrect where the architectural scheme can be seen as a silhouette on a light simple leaded background, for in this case the window-plane is not so much disturbed as it otherwise would be. A fine example of this is to be seen at S. Gudule, Brussels, where a tenlight window is treated by one large architectural scheme. The correctness of this window, however, is open to some contention owing to the massiveness of the scheme, but otherwise it is the finest of its kind I know of. It is a wonderful conception in design, and evidence of its consideration for the mullion is everywhere shown; the complete design shows that it is in every way governed by them. Other good examples are to be seen in Troyes Cathedral.

Architectural features may also be correctly introduced as backgrounds by being painted on light glass, which is leaded up in formal sizes and treated as a geometrical elevation, as shown by the accompanying illustration. It will be seen here that the figure composition tells as a mass in silhouette in the window-plane.

I criticised a point in Gothic glass just now as being incorrect, namely, a figure appearing partly in one light and partly in another, the mullion cutting through it, and I would like to show an example where this is not only permissible but necessary, but it is in a window of very different character and style, being the only one of its kind in a large circular room.

The upper lights of this window intercept a frieze of sculptured figures. It was consequently necessary to treat only these upper lights with figures, for that portion of the window was structurally in direct

Staircase Windows, United Provident Institution. Designed by Mr. J. Dudley Forsyth.

relationship with the frieze, and the same scheme of decoration of that part of the wall's area should be felt here. The frieze is divided into eight sections, seven of which are employed by sculpture—bronze figures on statuary marble ground—and one by the width of the window. It will be seen, therefore, that although it is a window of five lights, one subject only is treated to correspond with, and takes its place in, the frieze. Consequently it was found necessary to ignore to a certain extent portions of the mullions, but these were respected, and their place in the window was not concealed or unduly interrupted by overpowering masses of colour. The colouring of this window is governed by the sculpture, that being the predominating feature in the room, and is intended to represent an effect of golden bronze on white ground. A sculpturesque feeling is considered in the drawing of the figures and the ornament of the lower lights, but they cannot be said to represent sculpture, for they are considered in all other ways for their material, and are essentially glass. The material is self-evident everywhere, and is accentuated by spots of rich colour sparingly introduced.

My plea is for modern style and opportunities for the employment of the varied materials and processes which, I contend, are technically sound. To instance what can be done and has been done in technique, I would draw your attention to Swiss glass chiefly of the XVIth and XVIIth centuries. Although the examples to which I refer cannot be said to fulfil the requirements of a window on the lines of my argument, for they were never intended to, yet they are wonderful specimens of what can be achieved in processes and material. This glass is very beautiful as an art, and a magnificent collection is to be seen at the Laudes Museum in Zurich, mostly collected by Sir Henry Angst, His Majesty's Consul-General of Switzerland, to whom I am personally indebted for the following brief description of Swiss glass and the views illustrating it.

Description of Swiss Stained Glass.

"From the XIIIth to the end of the XVth century Swiss glass-painting passed through the same stages as that of other countries; the oldest works are those of the 'Rosette' of Lausanne Cathedral of about 1275. A fine circular window of about 1320 existed originally in the Cistercian Monastery of Hauterive, Canton of Fribourg, parts of which are now placed in Fribourg Cathedral. These are remarkable in consequence of the early employment of silver-yellow. A magnificent series of stained-glass windows of about 1340 is still to be seen in the old convent-church of Koenigs Felden (Canton of Argovie), and remnants of another fine set in the Monastery of Kappel (Canton of Zurich) of about the same time. Gradually the entire decoration of church windows with stained glass gave way to the less expensive one by means of isolated round or square panels, generally the gift of some patron, with his coat-of-arms. As early as the middle of the XVth century a similar decoration of windows in profane buildings, such as town and guild halls, was introduced, and gradually the custom of this ornamenting the interior spread to the private dwellings in town and country. A favourite place for panels bearing the coats-of-arms and names of the donors was in the cloisters of monasteries and convents, which thus became veritable picture-galleries of stained glass. A remarkable instance of this is the cloisters of the former Abbey of Wettingen, near Baden (Argovie), where over a hundred panels given by other monastic institutions, Swiss cantons, towns, and private people are still in their original place, the age of the panels ranging from 1500 to 1650, roughly speaking. An incredible number of donations of panels of stained glasss was made all over Switzerland, notably in the German part.

If a town built a new hall the cantons were requested to dedicate their shields, executed in stained glass; the same was the case when any of the numerous rifle associations built a new club-house, and scarcely a private house was built at that time without the friends giving a panel with their coats-of-arms. The custom, originally confined to the towns, corporations, and the richer citizens, became so general that even the peasants had their new houses decorated in that way; this explains the extraordinary number of panels of Swiss glass still to be found, not only in Switzerland itself, but in almost every country of Europe. When, after the wars of Napoleon, Switzerland had become impoverished, foreign travellers bought quantities of these decorative panels at low prices, and took them home to ornament their own houses. This universal custom of presenting each other with panels explains also the great number of Swiss glass painters in the XVIth and XVIIth centuries. No big town was without several of them, even small ones having at least one member of the popular craft within its walls.

The best artists of the time, such as Hans Holbein, Urs Graf, Nicholas Manuel, in the earlier part of the XVIth century, and Jos. Ammann, Christoph Murer, Tobias Stimmer, etc., in the latter, made cartoons for painted glass windows, and even painted on glass themselves. Swiss glass painters were very celebrated far beyond their own country, and had often to execute work for foreign buyers.

In the XVth and early XVIth centuries the panels had a more ceremonial character—an architectural frame enclosing the coat-of-arms of the donor on a coloured damask ground flanked by supporters in the shape of angels, ladies, warriors, heraldic animals, etc. With the advent of the Renaissance the severe style of the Gothic period was abandoned, the composition, though still adhering to the above pattern, became more free and varied. A variety of profane subjects, such as military scenes from their frequent campaigns, from ancient Swiss history, from domestic life, etc., was introduced into these panels, which are a most valuable source for studying the customs and costumes of the time. The period of the greatest development of this style of what is called 'cabinet-painting' is between 1530 and 1560, when the large employment of flash glass and of the most varied and delicate colours, coupled with a masterly design and exquisite execution, stamped the products as real works of art. The most refined and clever painter of this time was an artist only known as a glass painter, named Carl von Egeri, a citizen of the town of Zurich, who worked between 1530 and 1570, and whose work full of delicacy and beauty, has never been excelled or even equalled by others.

The invention of enamelling glass, which is attributed to this very man, Carl von Egeri, brought a new element into the art, but also led to its speedy decay. It was so much easier to melt the colours on the glass than to cut out the flash glass in the old way that the painters soon abandoned the latter and began to rival oil painting, thus destroying the fine effect of the distinct leading in small pieces separating the colours well one from another, and the mosaic character of the panels. Probably in consequence of the appearance of the panels becoming less and less attractive, probably also owing to the diminished prosperity of Switzerland, the custom of panels as gifts gradually died out towards the end of the XVIIth century and the beginning of the XVIIIth century.

Now good Swiss glass of the XVIth and XVIIth century is eagerly sought by museums and private collectors, and prices have risen considerably of late.

The Swiss National Museum in Zurich, where over 600 panels are exhibited, of which many are of the first order, has awakened the interest in this ancient Swiss art at home and abroad, but the great demand for such work has had the usual result, viz., to lead to the production of more or less dangerous imitations, which are often palmed off on the unsuspecting buyer as genuine old specimens."

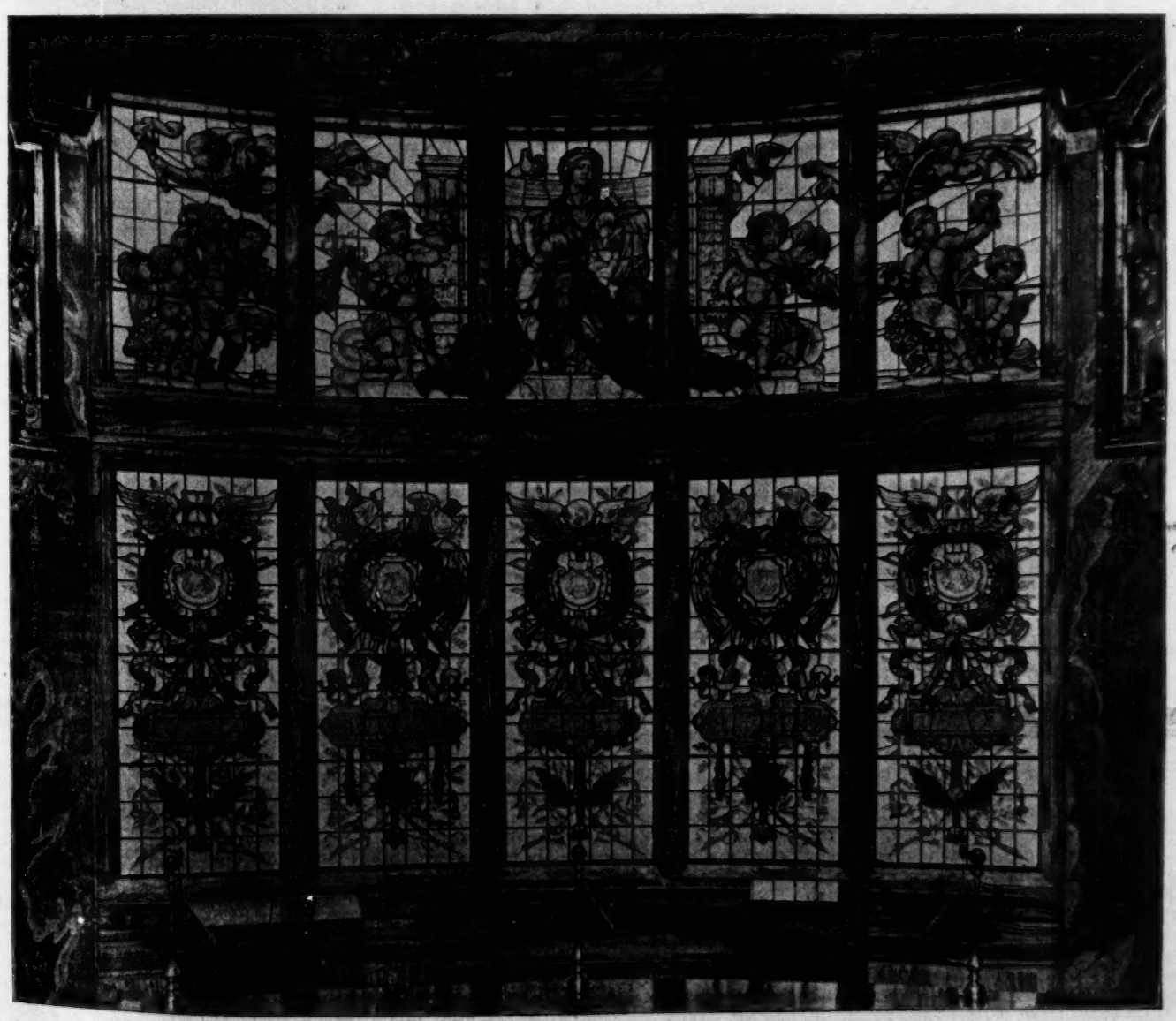
By all this it would appear, after ages of reform of styles, application, technique, and progress generally in this art, and profiting by the experience of those who have gone before, and aided by all the modern achievements of the glass-blower, that the artist of to-day should find it an easy task to treat a window correctly. But it is not so. On the contrary, it is a difficult thing. The fact of possessing so much scope in almost unlimited material is really a dangerous element and is apt to draw one into the maelstrom of perplexity and despair. Difficulties are many, and through excessive zeal and enthusiasm to dabble in all the most gorgeous colours at hand one is likely to stray from the primary motive. Work may suffer, to the disadvantage of correct application, for fantastic and incongruous effects. It is here trouble is asked for, and here one has an unpleasant five minutes with the architect. But we have to be conscious of the pitfalls and avoid them.

I believe there is no applied art over which there is so little agreement, such varied ideas, and uncertain opinions as stained glass, and in this cursory review of the subject I hope I may have suggested points for debate which will be to our mutual benefit and instruction."

Mr. C. Harrison Townsend, in proposing a vote of thanks, said that Mr. Forsyth remarked that the stained glass artist should begin from the point of view that the craft was successful only so far as it was loyal to and honestly followed the conditions of material, treated in the way in which these should be treated, and that was true of all the crafts. Mr. Forsyth showed that he had formed very clear conclusions as to what was justifiable and, so to speak, legal in stained glass, and what was not. Some of them had seen a small exhibition in Bond-street some time ago by Tiffany, of certain glass made in America. There, by methods for which there was no precedent, Tiffany gained certain subtleties of colouring by super-imposing, say, red and yellow, and getting results which could not be obtained in the usual way, but were brought about by bringing the two glasses into intimate relation, so that one lent to the other and produced an effect otherwise impossible to obtain. Was that legitimate, or was it a trick? If a trick, how did it differ from the practice of using thinner and thicker glass to get a lighter or darker shade? Another thing which might or might not be legitimate was using the accidents of glass to produce effects. If they were working blue drapery and the glass happened to be flooded with a darker streak, was it legitimate to choose this glass and gain an added effect by accident? There was only one glass-worker he knew who called to his aid the use of the wheel, which, if properly used, helped in producing certain changes which were legitimate and obtainable in no other way. Given a drapery where a certain brilliancy of effect was required, for instance, some incident in the design, such as an ornament on a robe, or a crown, or a nimbus, was it not possible, by placing the glass over a wheel, to gain this desirable emphasis? Again, he would have liked to hear something as to the debatable point of the saddle-bar, which the architect and the stained-glass man discussed so much—whether the saddle-bar should be discarded; whether it should be twisted round the head of a figure rather than run right across the window; whether, in fact, they were to be bound by the saddle-bar, and should modify the design to accommodate it.

Mr. G. H. Fellowes Prynne, in seconding the vote of thanks, said that one of the greatest difficulties at the present time in stained glass work was that we have so many materials. There were such vastly better opportunities of turning out good glass and so many more mechanical

arrangements for doing so than there were in mediæval times, that it seemed as though these opportunities were blessings; but it was a great question whether they were, and judging from some of the glass turned out during the last part of the previous century, those opportunities seemed to be a curse rather than a blessing. Whatever might be said of the old glass, or the crudeness of the drawing—which could not be defended in itself—the glass of the XIIIth, the XIVth, and even the XVth centuries, was the most splendid we have at the present time, and we could not shut our eyes to that fact. One would like to see the most perfect drawing possible, and yet to see the new materials we have used as far as possible to the advantage of the art. Why, with all the new appliances and materials, had we not risen to our opportunities? It must be either from lack of feeling for colour, which died out greatly during the bad period of stained glass, or some other reason. Perhaps we might be allowed to think that we were regaining strength and power in the design of stained glass. Of all the techincal arts he did not think there was one which was more interesting in its technique than stained glass, and those students who had been through workshops and studios of stained glass artists would realise how varied were the interests of the work. Many architects had even given up architecture for the pleasure and fascination of the detail of stained glass work. Mr. Forsyth said that there could be no mechanical rule by which a window was to be coloured; it must be coloured strictly in accordance with the requirements of the situation. That spoke for itself and was a very sane remark, but there was one thing which had been the bugbear of stained glass—*i.e.*, the miserable commercial spirit which reigned in the making of much stained glass, not only now but in the immediate past. Again, there was the matter of the artist not taking the interest in his work that he should. He did not say it in order to run down the profession, but he had come across the artist in stained glass who did not take the trouble to see the place where his work was to be placed; and also the artist who did not look at the work when it was in position. The spirit which brought about such apathy did not tend to the development of such a difficult art as stained glass. There were other difficulties. Mr. Forsyth said that the architect should be in close touch with the artist, which was another truism that none of them would deny; but there were two essentials: first, that the architect and artist should be in absolute sympathy, and for that to be possible the architect must know something about the material the artist had to deal with, for an architect to interfere with a stained glass artist, who was an artist in the highest sense of the word, was, unless he had knowledge of the material, a piece of impertinence. He strongly advocated that in every technical art the artist should be absolutely in touch and in sympathy as far as possible with the architect, and the architect with him. Every stained glass window that he put in a church he tried to be in touch with the artist throughout, and he talked the matter over with him and tried to get his feelings; and the artist, as a rule, tried to do the same towards him. He strongly condemned breaking up the lines of the architecture and running the figures through the mullions, which was so fatal in much of our modern glass work. As to the saddle-bar difficulty, he was Gothicist enough to think that the saddle-bar helped the work; it gave a strong line at a weak portion of a wall of a building, where the want of a connexion was felt. If a saddle-bar was treated boldly it helped the glass, whether stained or plain. One was almost tempted to sympathise sometimes with the architects who had lately gone to the other extreme and said they would not have any stained glass in their churches rather than use modern glass; but that was really going to an unnecessary extreme, and he believed that we should get in the future, as we had got in the past, perfectly good stained glass if architects and artists worked together. One difficulty was that nowadays people wanted portraits of themselves or relatives put in windows; because the mother or sister or wife of the donor of a window was named Mary they wanted a portrait of the relative on the shoulders of a St. Mary, etc., and all that was very difficult. He advised those who were choosing subjects for a scheme for either church or secular work to let the scheme run right through the building, letting it be a teaching from beginning to end. That was generally welcomed by those in authority. If they did not do that they ran the risk of any donor who came along wanting some particular subject, and the result was a lot of heterogeneous things which might be very beautiful in themselves, but which generally fought one with the other; and there was a want of feeling and harmony and an absence of peaceful effect in the lights. In choosing subjects one ought to take a



Window, United Kingdom Provident Institution. Designed by Mr. J. Dudley Forsyth.

sequence of events right through the scheme. In a recent case such a scheme had been prepared when a donor, a sailor, said he should like to see the subject of Jonah treated. That would have broken up the scheme, and the donor was asked if he wanted Jonah in or out of the whale. Fortunately, he did not persist and the scheme was carried out. The more a student in the present day entered into and studied the interesting technique of glass the more likely were they to improve our glass in the future and for the architect to work in real sympathy with the artist.

Mr. F. C. Eden said there was one little point worth emphasising. The glory of stained glass was its colour, and if one went to any place famous for glass, did he trouble about the drawing? It was the colour one went to enjoy, and that was what ought to be remembered in modern work—not, of course, to neglect drawing, but above all to remember that colour was the be-all and end-all of stained glass. As to some modern architects wishing to keep stained glass out of modern churches altogether, if they did keep it out because they could not get good glass or designs, or because it could not be afforded, it was still more important to keep out a kind of tinted cathedral glass which was neither one thing nor the other. He strongly advised keeping the glass in such circumstances to plain sheet, especially if they were in the country, where the trees could be seen and the sky; it was better that the congregation should endure a little sun occasionally than bad colour.

Mr. F. E. Sidney said he was a collector of old glass and he knew very little about the technical side of the subject. It was obvious to those who saw the glass of the XVIth century that we had not attained to anything like that work since. Many of the finest windows went back to those days. It was difficult to explain or justify the bad drawing to be seen in those old windows. In the early XIIIth century the art of perspective was not much known, or the art of figure drawing, but a beautiful picture by Fra Angelico with all its false anatomy was better than some of the pictures to be seen in the Royal Academy at the present time. There was one answer which covered the question—*i.e.*, "that the letter killeth all the spirit giving life." With all our modern requirements and with so many technical arrangements, this was rather forgotten.

Mr. Arthur Keen said that Mr. Forsyth had taken up the line that any process known to the glass painter was admissible, but on the other hand, there were authorities who advocated the use of glass as pure as possible, with as little applied decoration as could be got through with, on the principle that the colour of the glass was more effective than anything which could be placed upon it, and that brilliancy was lost when painting was resorted to. He should have liked that point discussed. It seemed to him that the balance of opinion was in favour of quite the earlier periods of glass painting, and that the old mediæval glass was so much finer than the later in many respects that the defects in it could be set aside. The old glass possessed brilliant colour, glitter, and was so fine in scale, that there was always a general interest in it. It was defective in drawing, but that was a small matter in his judgment. The later glass offended by attempting too much; it went too far and attempted subjects which would be better treated on a wall than on a window. The brilliancy and transparency of the glass were the great things to be maintained, and the colour was the factor on which the success of the composition usually depended.

Mr. Louis Ambler said that however much they sympathised with stained glass artists and took an interest in their work, architects could discuss the matter only from an amateur's point of view. Few, if any, of them could design stained glass, and none of them could know much of the technique. As to the choice of the subject, people seemed to think that in church windows, for instance, they must be limited to scriptural subjects, but that seemed to be a very narrow point of view. He could not see why subjects should not be either allegorical or symbolical—or historical, even, and it seemed to him that if there were worthy people in a particular locality, their portraits, or scenes or events connected with their lives, or with the place, might very fitly be illustrated in churches just as well as in secular buildings. And in secular subjects heraldry might be brought in, for it afforded splendid scope for beautiful treatment of drawing and colour. While admiring the colour of both the old and the modern glass, and the old particularly, he did not see why we should not have the best drawing possible, as well as the best colour; and he was inclined to think that many of the beautiful old tints we admire in old glass were partly due to the lapse of time and the action of the weather on the glass. He could not think that the old glass in Chartres and other places had not been modified and affected all the intervening years by the weather. It was, he thought, more gorgeous when put up, though not so gaudy as mid-XIXth century work. He was glad that Mr. Forsyth condemned the use of much canopy work. He (the speaker) preferred the canopy work omitted altogether. In the few instances of it shown by Mr. Forsyth it was not so objectionable, for in those cases it was fairly well treated. There was a question he might ask as to background and as to clothing figures. If one took a New Testament subject, say, was it legitimate to use a German city for background in, perhaps, a view of Calvary? and, in a Crucifixion picture, was it allowable to clothe one's figures in XVth century or XVIth century costume? As to Tiffany's modern glass, and the effects produced, one effect was got by the use of modelling, not only by superimposing the colours—modelling the glass and having it very much raised and of different thicknesses. He agreed with what Mr. Prynne said as to saddle-bars: unless they came right across the face, they were not objectionable.

Mr. H. P. Maule said that one point had not been sufficiently emphasised, and it was the crux of the whole question. It seemed to him that they had to make up their minds whether they were to subordinate the windows to the building or the building to the windows. Subjects were treated sometimes in such a way that they seemed to shout out to us because they were not subordinated to the surroundings. Of course, there were many exceptions to this, and he remembered the scheme in the Church of Sainte Chapelle in Paris, the treatment of the glass of which was very satisfactory. The leading, the ironwork, the panelling and all were subordinated to the building, and the effect was entirely satisfactory because it was under control. So much that was unsatisfactory in modern glass was due to the fact that it was emphasised so much, and one's attention was directed to it, whereas one should be only sub-conscious of it. Surely the building up of a large subject and making a picture of it, was wrong in principle. It was clear that Mr. Forsyth wanted flatness, and that, generally speaking, was what one did not get in a large subject.

The Chairman, in putting the vote of thanks, said that the question raised by Mr. Maule as to the wall surface *v.* the window surface was of great importance. It always seemed to him (the Chairman) that the early glass was satisfactory mainly because it was subordinate to the building. The decay of Gothic architecture, which began, roughly, about the year 1350, was due, for one reason, to the rise of individualism amongst the workers, and in glass this was clearly seen; and from that time glass windows increased in size until the end of the XVth century we found in the choir of Gloucester what was practically a glass sheet supported by some mullions. The earlier work took its proper place in a building, but the later work was not subordinate to the architecture. Enough had not been said that evening as to the sentiment of the early glass; these windows were in harmony with the atmosphere of the building, and there was a strong feeling of sentiment in their design. As to plain window glass, there was no doubt that it was an advantage to have it in a country church. With the country-side around, with trees and clouds to study, there were few sights more beautiful to look at than a well-porportioned Gothic window. If there were figure subjects in the windows, there was no reason why they should not have plain backgrounds. In towns, where figures could not be afforded for the windows, he thought more might be done with landscape, in a more or less decorative form. Enough was not done with landscape glass. In a church behind the Hotel de Ville in Paris there used to be a window of five lights, and right across it a green field, a little river, and some figures of saints were shown, all subordinated to the wall. He remembered seeing a cartoon for a window design by one of our greatest landscape painters, Mr. Alfred East, and it was simply a landscape—a lancet light, showing a great tall tree and a little river going away into the distance. Where there was not enough money for figure treatment something of this kind could be done, and in towns there was nothing more refreshing than to go into a church and see a beautiful landscape in the glass.

The vote of thanks was then put and carried with acclamation.

Mr. Forsyth, in reply, said, as to the American glass by Tiffany and the legitimacy of plating, his belief was in the judicious use of all processess, and he considered plating in glass to be quite legitimate. As they had heard, there was modelling in the Tiffany method. The glass was modelled and shapes were taken while it was hot. The effect of drapery lines and colour was got by accident and by manipulation. With regard to saddle-bars, he considered that they should be the first things designed in a window, and they should not be knocked and twisted about to suit any design; they should be constructional objects which took their place for some obvious reason, which was strength. As to colour, in selecting coloured glass for a window the artist was quite at liberty to utilise colour just as he liked. In most of the best-coloured glass there were tints which could not be obtained by the glass-blower except by accident. Regarding the architect and the designer being in sympathy, that was quite right, but there was a certain line where the influence of the one must govern the other. The architect who designed the building should know necessarily the type and style and character and quantity of the decoration he wanted, and he should decide what he wanted, and having done that he should impart his views to the decorator, who should try to be in full agreement with the architect before he commenced his design. The designer should then be left to look after his design himself. With regard to portraits in glass, he thought they were a mistake, and one often met people who required them introduced into windows. In a church in Manchester the figure of General Gordon, in khaki breeches, etc., and surrounded by angels, had been placed in a window, and it looked quite out of place. Colour being the essential part of a stained glass window, the way it was introduced had also to be considered very carefully. If landscapes were introduced into the windows, it was better to use plate glass, in order that it might be seen; with stained glass it could not be. As to the date and style of costume and surroundings of a window, that was a matter for the donor, rather. He could not speak with authority on that point, nor as to the question about figures out of the New Testament, though he knew how he should do it. There was the

recent case of the Duke of York being represented in a statue dressed in a Roman toga. Treating of flatness in a window, the window was a more important surface than the wall, but it ought not to supersede the wall or the building. The building was the chief consideration, and any attempt to make it comparatively insignificant by the undue consideration and treatment of the window was a mistake. Landscape should be treated conventionally; it should not be treated so that one seemed to see miles of distance.

The Chairman said that the next meeting would be held on February 7, when Mr. C. Harrison Townsend will read a paper on "Garages and Motor Houses."

The meeting then terminated.

THE ARCHITECTURAL ASSOCIATION SPRING VISITS:

II.—United Kingdom Provident Institution.

The second spring visit of the Architectural Association was made on Saturday, January 25, to the offices of the United Kingdom Provident Institution in the Strand, one of the most important of the recently completed buildings in London. The party of members, limited to fifty and including the President, was received by the architect, Mr. H. T. Hare, who gave information upon the planning, the construction, and materials used in the work.

This was the second visit by the Association to the building; the former occasion, of which we published a brief report on February 2, 1907, took place during the progress of the building operations. In our issue of August 10, 1907, we illustrated the work in a general way, together with plans and a description.

On the present occasion the visitors were enabled to see the completed building put to its uses. The plan, which is essentially architectural, is well adapted to the practical necessities of the business; indeed, bearing in mind the limited area and irregular shape of the site, the local restrictions and the desired accommodation, it may be said to be one of unusual skill.

The general intention has been to produce a monumental work reflecting the progress and prosperity of the Institution, in which particular considerable success is achieved. The architect has associated himself with many artists, each well known in his respective craft; this collaboration constitutes one of the chief interests of the work.

The Portland stone exterior, which assumes a concave plane, is massive in character and interesting in treatment, yet conforming to a type popular with architects in its selection and distribution of features. The absence of stone background or enclosing panel from the beautiful figures of the ground story by Mr. Poole is perhaps the one unrestful note in the composition.

The large circular public office is the principal apartment of the interior. Here, as well as in the entrance, the staircase and main corridor are excellent decorative schemes in green marbles. In detail the First Empire period has inspired the architect in a satisfying and consistent general design.

The board-room on the first floor has most attractive proportions. The painted ceiling by Professor Moira is a fine effort, and here, as in the rooms adjoining, oak panelling and plaster enriched ceilings are introduced in excellent design and with good restraint.

Large stained-glass windows by Mr. J. D. Forsyth, and some charming vitreous mosaic wall and ceiling linings form important parts of the work.

A hearty vote of thanks to the architect terminated the afternoon's proceedings.

Dulwich College.—At the last meeting of the Estates Governors of Dulwich College Mr. Edwin T. Hall, F.R.I.B.A., was elected Chairman.

THE SURVEYORS' INSTITUTION:

Some Urban Land Problems.

An ordinary general meeting of the Surveyors' Institution was held on Monday at No. 12, Gt. George-street, Westminster, S.W., Mr. T. T. Wainwright, President, in the chair, when Mr. A. W. Crampton read a paper entitled "Some Urban Land Problems." He dealt with the subjects of unearned increment; land values as the sole basis of taxation; the experience of the colonies in the rating of unimproved land values; land nationalisation; and extension of powers of local authorities. Under the last heading he made some remarks as to housing, and said that at the present time housing reformers were advocating the purchase of land by local authorities as one step towards a solution of the housing difficulty. One great advantage which accompanied public ownership was that when the land was developed for building it could be laid out on the most approved modern principles, so as to obtain for the dwellers upon it the maximum of health, recreation, and pleasant surroundings. It had, however, been observed, as might have been expected, that sales of public land in Germany had not helped in solving the housing problem because, as the Council of the City of Frankfort stated:—"Repeated experiments have shown that speculation is not hampered if the town sells land outright. The town cannot prevent land which it may sell at a cheap price from being put up in price unfairly by private individuals, and the benefit being confined to those who first buy from the town." Certain towns endeavoured to avoid this by stipulations of sale.

In order to avoid these results the leasehold system was being adopted in Germany, so that the local authorities might retain the ownership of the land. If the local authority leased its land, then the lease must be sufficiently long to encourage builders to build. By granting long leases it deprived itself of much of that unearned value which accompanied development, and as a consequence builders and dwellers upon the leased land obtained a bounty in the shape of lower rent, while land owned by private persons attained maximum prices. In short, all piecemeal dealing with land by local bodies could be impeached on logical economic grounds—the only consistent policy was that of complete public ownership. If the burden of rates was relieved by applications of unearned increment from part only of the land in a given area, the logical conclusion was that the whole increase on the whole area should be so applied, or, if it exceeded the amount required for rates, to some other beneficial purposes. Whether the time was ripe or not for land nationalisation, it was high time that the hands of the local authorities were strengthened in regard to the manner of development of land in their districts. The owners of land, however small in extent, could run roads where they liked over it. They did so without regard to the way in which new roads join existing roads and main thoroughfares. All that was considered was the turning to fullest account of every square yard of land. In no case did they consider whether the new roads would, when continued, be at all suitable for the development of the land of adjoining owners. Nor was it to be expected, under an individualist *régime*, that they should. But here was obviously a case for public control. Land should be developed not according to the whim of an individual owner, but in a systematic manner for the best interests of the people.

There were plenty of cases in which roads were made through narrow strips of land, and then steps taken to prevent their continuation through neighbouring property. In these cases, instead of these roads meeting other roads beyond at right angles, there was the ridiculous spectacle of their junction being blocked by the erection of houses. There were many ways of preventing this junction or continuation of roads even without the erection of buildings—by the reservation of a strip of land or the erection of a wall or fence at the end of the new road. He was as keen as any other surveyor he hoped in advising his clients to protect their interests in this way when circumstances required, but, from the point of view of a sensible and orderly development of a town, such obstruction was obviously absurd. Similar difficulties occurred with regard to levels of roads. The owner of a building estate paid no regard to the levels of adjoining land in fixing the levels of his new roads, and local authorities either had no power to regulate this or did not appear to exercise it.

Then the areas of the authorities were not developed on any rational lines. Which part of a town or place should be built upon was determined not by the needs of a district, but by the whims of owners and the whims of buyers and speculators. Acres of ripe land remained unbuilt upon, whilst less ripe or even unripe land was utilised. Workmen were driven beyond the outskirts of a town, in order to preserve some wealthy resident's uninterrupted view or to enable him to reap unearned increment. He would refer also to the manner of constructing on private land in developing districts roads which were often unworthy of the name. About the only thing that was done sometimes was to leave a width of 36 ft. What this meant to the poor and the working classes, often thinly shod as they were, was known only to those who used such roads. In summer time they were heaps of dust and full of holes, in winter heaps of mud and full of pools, and with deep ruts always. Often they had no curbing, no channelling, and nearly always no decent footpath. When they were sufficiently lined with houses the local authority ordered them to be properly constructed and took them over, but meantime the residents suffered. It only seemed reasonable that if houses were erected there should be a proper road to them, and it would appear eminently desirable to empower local authorities to require such a road to be constructed before allowing the houses to be occupied. The erection of houses in those parts of the districts of an authority obviously best adapted and most required for the purpose would allow the construction of good roads. He left sure that it would shortly be recognised as desirable that the direction of roads should be fixed at once in growing districts, so that each landowner might know where they would cross his land. He saw no difficulty in a District Surveyor laying out these routes. He would have regard to the levels of the district, avoiding as far as possible steep ascents and descents, and generally following those rules of prudence observed in the construction of railways and main roads. The result of our present system was that each owner had his own little arterial system of roads with no regard to adjoining land and no consideration of public convenience. Speculation in unripe or partly ripe building land leads also to an uneconomical expenditure of public money. Sewers, gas and water mains had to be carried to such land past land thoroughly ripe for building. It is difficult to see how many of these evils could be cured by anything short of acquisition of the land, and they pointed to municipalisation or nationalisation as the remedy.

A discussion followed, and a hearty vote of thanks was accorded to the author.

Post Office, Stoke.—Messrs. Meiklejohn & Son, builders, of Stoke, who erected the Hanley Post Office, have received from the North Stafford Railway Company an intimation that their tender for the erection of a new post office for Stoke has been provisionally accepted by them. The railway company are to erect the buildings on the site adjoining Stoke Station, and the Post Office Department are to rent them. The amount of Messrs. Meiklejohn's tender is stated to be about 6,000*l*.

Fifty Years Ago.

FROM THE *Builder* OF JANUARY 30, 1858.

RESPONSIBILITY TO WORKMEN FOR LADDER ACCIDENTS.

THE case of Ormond *v.* Holland, in the Queen's Bench, is an action by a bricklayer's labourer against his employers, builders, to recover damages for injuries sustained from the alleged negligence of their servants. While ascending a ladder in the discharge of his duty one of the rounds broke, and he was precipitated to the ground, and received severe injuries. After evidence had been adduced on both sides, Lord Campbell held that the action was not maintainable, and directed a verdict to be entered for the defendants; but the jury assessed the damages at 25*l.* and his lordship reserved leave to the plaintiff to move the Court to enter the verdict for him for that sum.

*** Curious to reflect that after half a century we have only just had the Report of a Committee appointed to settle this question of responsibility for accidents as between employer and labourer, and to inquire into the causes of accidents.—ED.

THE LONDON COUNTY COUNCIL HALL COMPETITION.—The Establishment Committee of the London County Council have been considering this week the Report of the assessors in the final competition for the new County Hall. The assessors awarded the first place to the design submitted by Mr. Ralph Knott, Oakley-street, Chelsea, and we understand that the Committee have accepted the award.

Illustrations.

CENTRAL LIBRARY, ISLINGTON.

A COMPREHENSIVE scheme of Public Libraries has been initiated by the Islington Borough Council, to whom Mr. Carnegie gave 40,000*l.* for the purpose. The building illustrated has been just completed at a cost of about 20,000*l.*; and there are two smaller branch libraries already built and occupied, while a third is contemplated.

The accommodation consists of juvenile-room, lending library, reading-room, reference library, lecture-rooms, and the usual staff rooms, etc.

Both lending and reference departments are worked on the "open access" system, and a special feature of all these libraries is the absence of newspapers.

The front shown is entirely in Portland stone, and the whole of the internal joinery is in wainscot.

Mr. H. T. Hare is the architect. The illustration is from a photograph taken specially for this journal, as an illustration of recent London architecture.

MIDDLE HILL, HOOK HEATH, WOKING.

THIS house is situated on the top of the hill, just before the fall to the south begins, and commands extensive views to the south and west. The house was built in 1904. Our illustration is from a drawing which was in the last Royal Academy Exhibition.

The roofs are covered with red Kentish tiles. The walls are faced with red bricks of varying shades. The stone quoins are Monk's Park. The house is lighted by electric light fitted by Mr. Quartermaine, of Woking.

The system of lightning conductors was fitted by Messrs. J. W. Gray & Son, Leadenhall-street. The grates were supplied by Messrs. Shuffrey; Messrs. Elsley; and Messrs. McDowell, Stevens, & Co.—these latter being "fire on the hearth."

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THE CHAPEL OF THE RED MOUNT, KING'S LYNN.

SITUATED amidst a splendid avenue of elms known as "The Walks," in the town of King's Lynn, this is one of the most interesting architectural studies in the district.

This chapel, dedicated to St. Mary, was built for the use of pilgrims on the way to the shrine at Walsingham. Outside the building is a platform of earth, which is retained by a surrounding wall supported by buttresses. Inside are two chapels, an upper and a lower one, with the vestry and the priests' chapel between.

The lower chapel is entered from the north-east door in the outer wall, although at one time this was the priests' entrance only, and the people's entrance was by a passage under the west door, which is now blocked up; it is vaulted in brick and at present in a very uninviting state, all the decorations and pavement having gone. Just inside the west door is a window from which the service in the lower chapel could be seen. To the right of this entrance are the main stairs to the west door of the upper chapel. In passing the east end of the chapel a passage is formed under the altar, the walls being supported by two arches.

The interior of the upper chapel is a most beautiful piece of XVth century work. It has a nave, transepts, and choir, vaulted in stone, and is lighted by four quatrefoil windows. Near the south door are the steps down to the priests' chapel and vestry and to the doorway in the north-east outer wall.

The chapel of the Red Mount was built, according to entries in the Corporation books, in the year 1485; it stands on public ground, and it is owing to a dispute between the prior of Lynn and the Commons that the date can be fixed.

The chapel has been used for various purposes. In 1575 the lower chapel was a conduit of receipt containing a water cistern, and was also used as a stable. In 1638 it was used for the town store of gunpowder; and in 1783 a teacher of navigation had it, who made a gap in the north wall to facilitate his star-gazing. In 1828 it was carefully restored by public subscription, and is now under the care of the Corporation, with an attendant to give information to visitors.

RALPH SUBRIDGE.

Chapel of the Red Mount, King's Lynn.

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ISLINGTON CENTRAL LIBRARY, HOLLOWAY ROAD.—M

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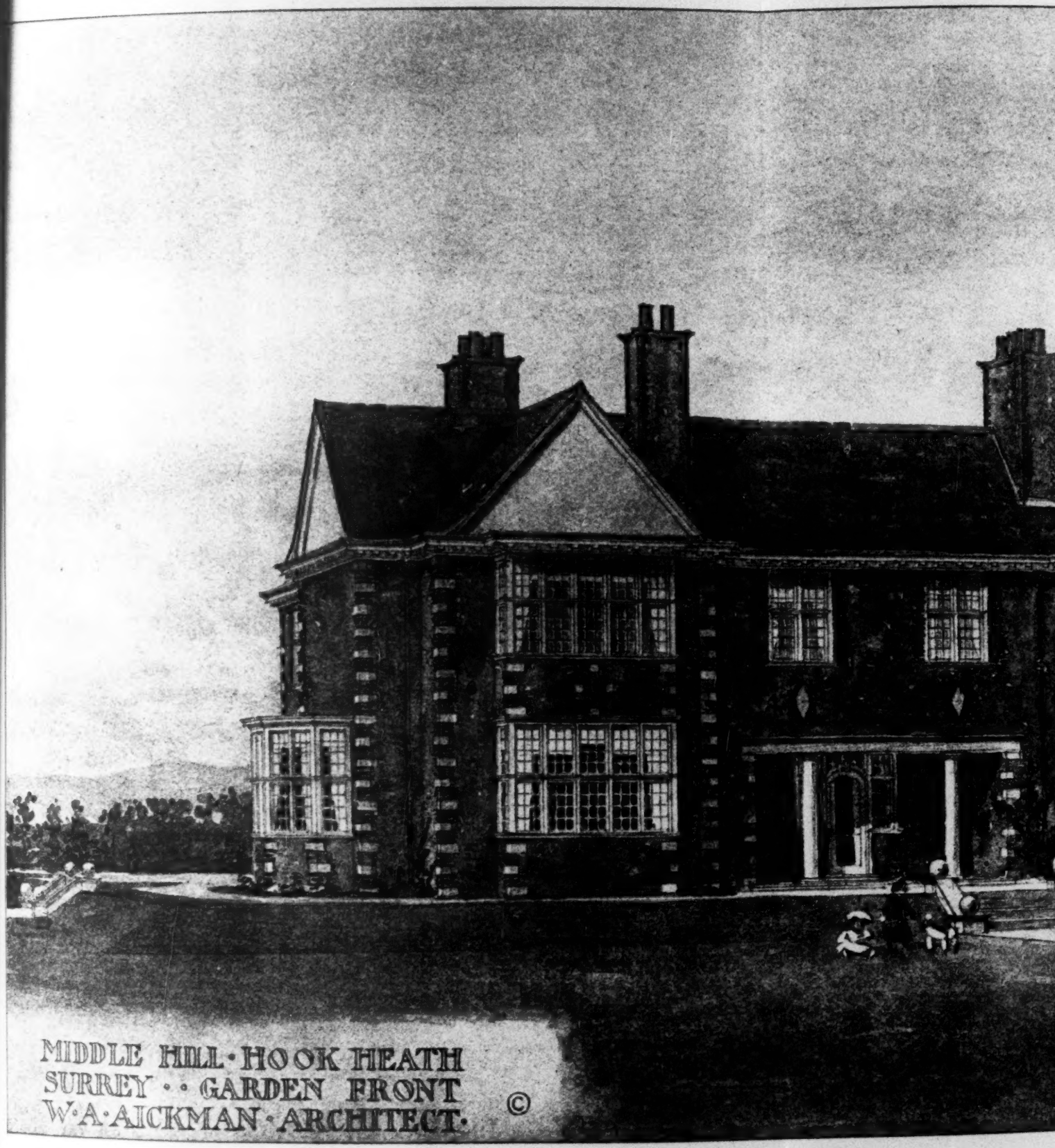
TAY ROAD.—Mr. Henry T. Hare, F.R.I.B.A., Architect.



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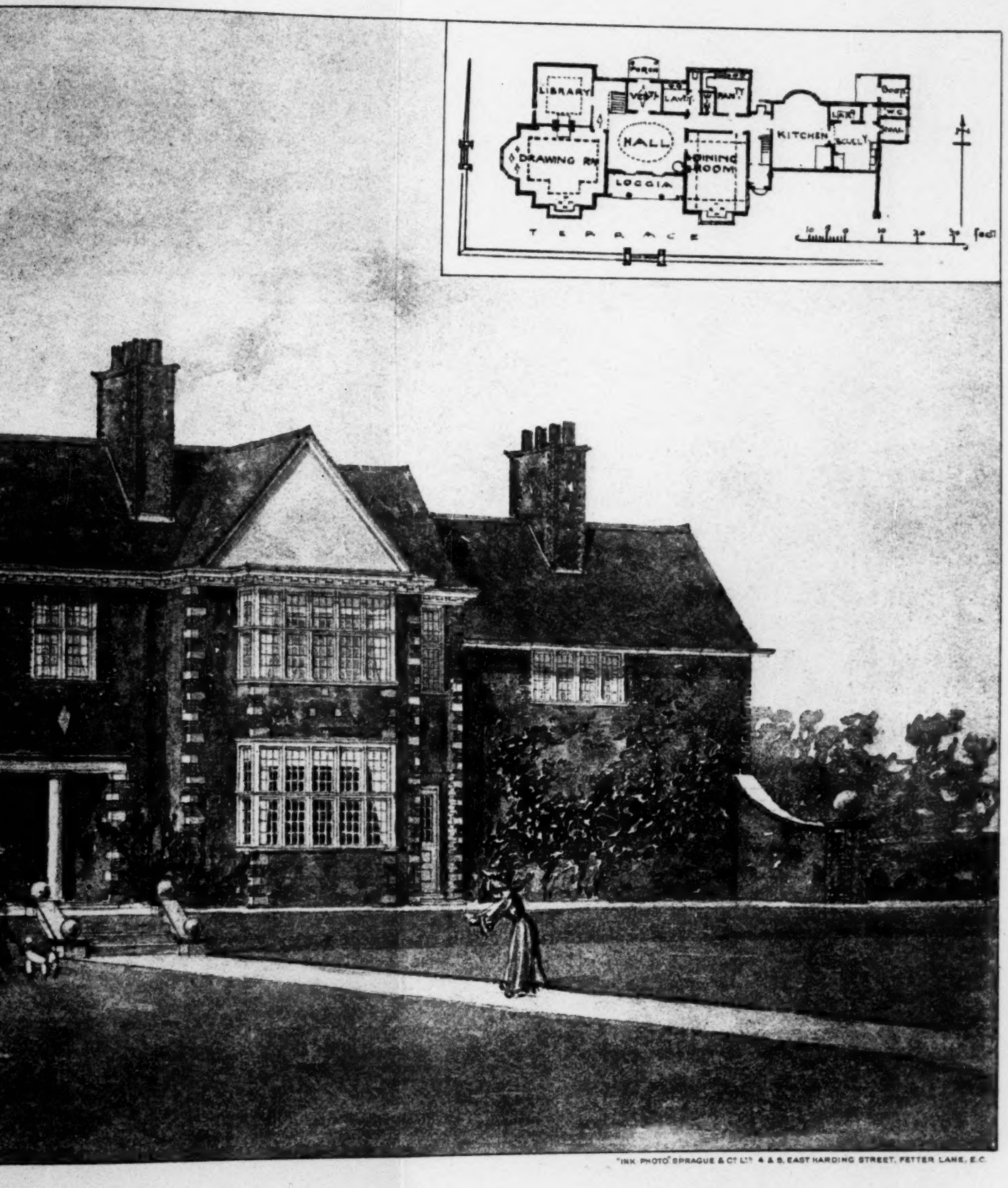

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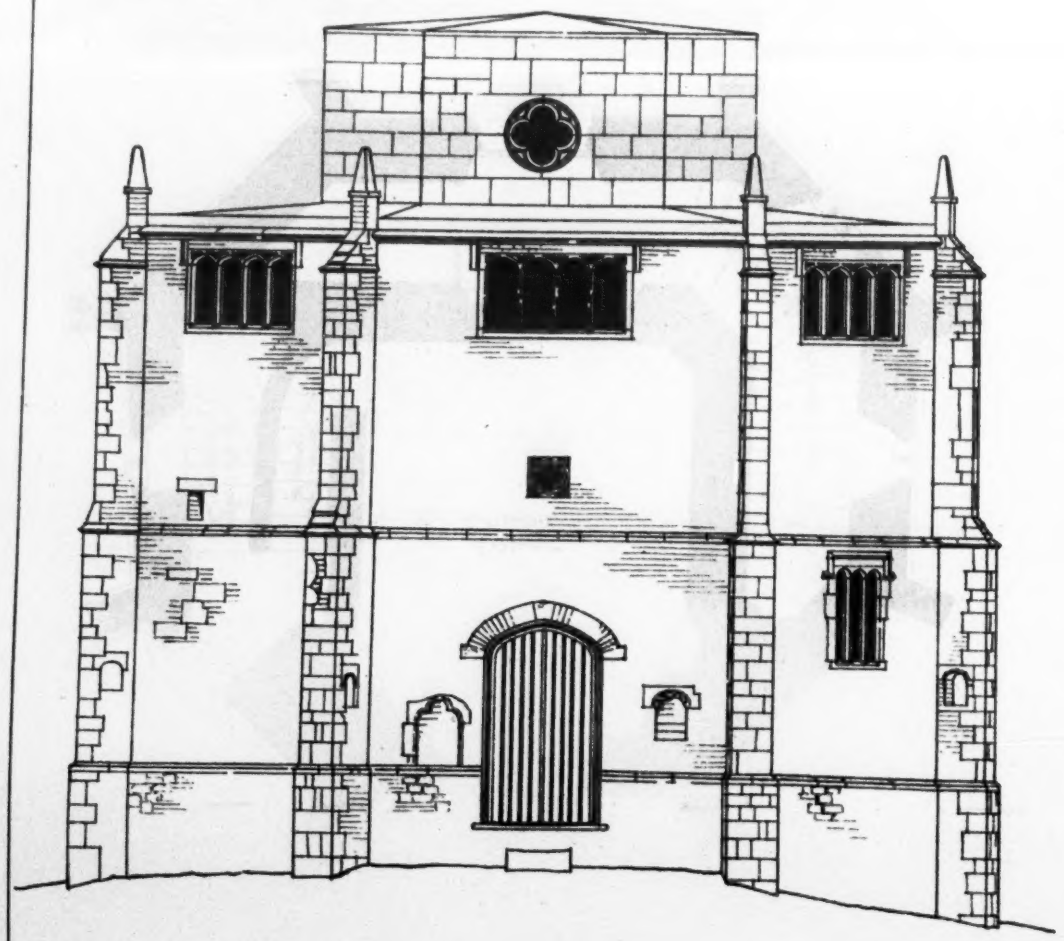
CHAPEL OF THE RED MOUNT KING'S LYNN.



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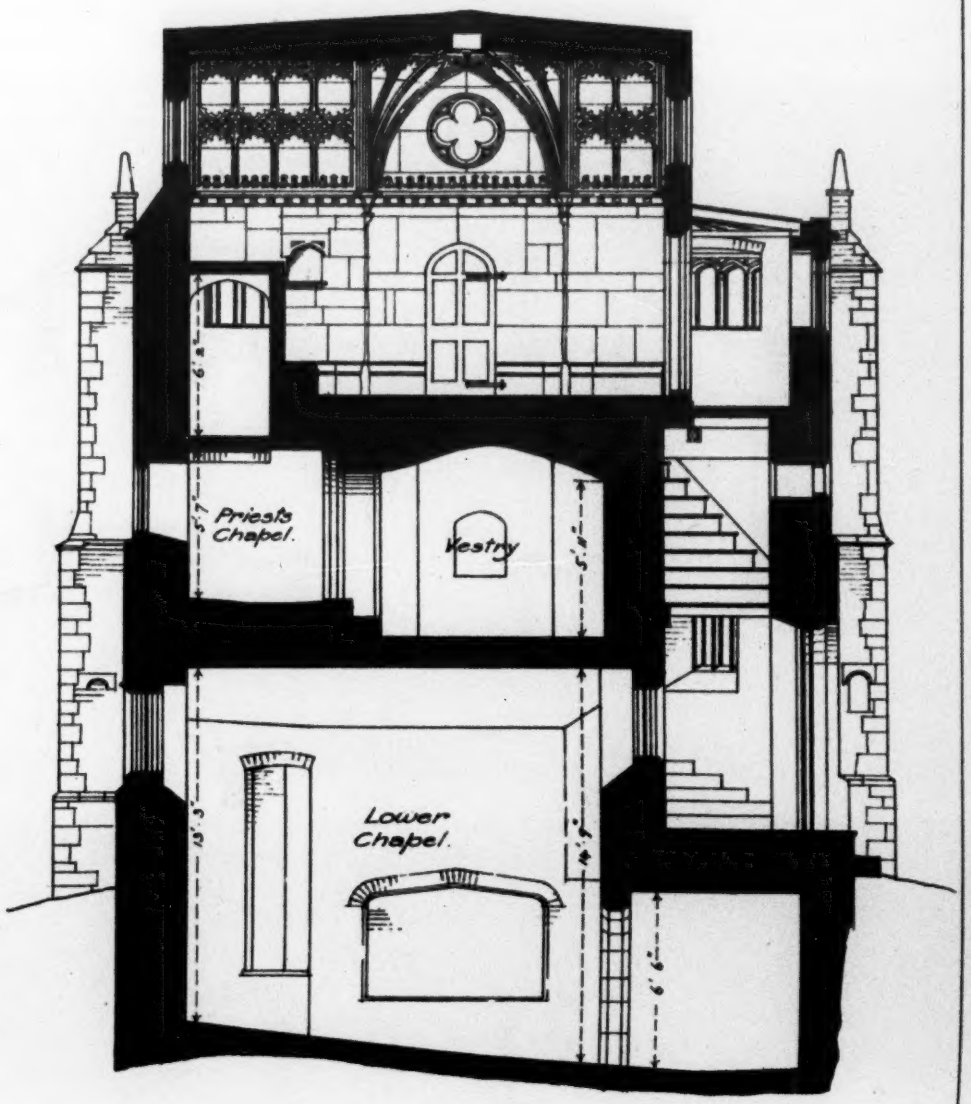

SECTION LOOKING SOUTH

Measured & Drawn by Ralph Surridge 1907.

PHOTO-LITHO. EMBASSY & CT. LTD. 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

THE BUILDER, FEBRUARY 1, 1908.

CHAPEL OF THE RED MOUNT KING'S LYNN

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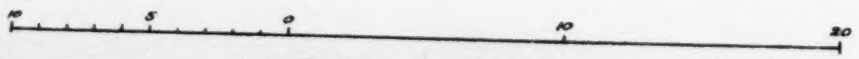

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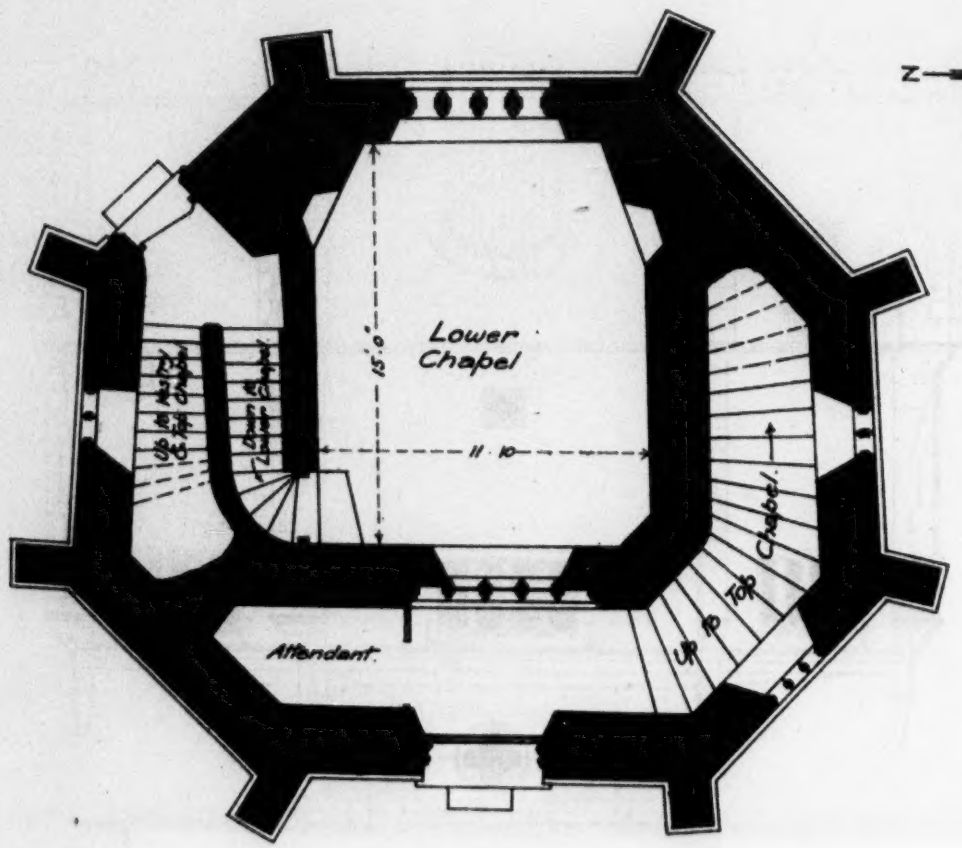
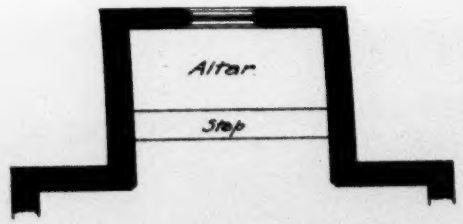
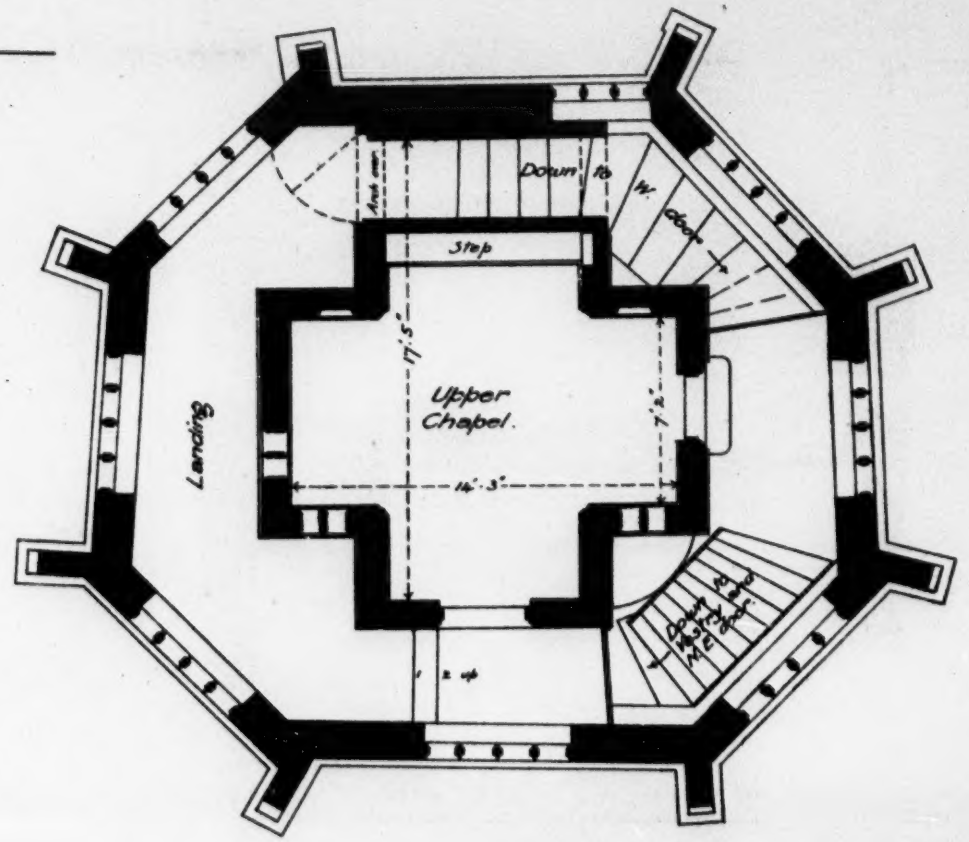


GROUND FLOOR PLAN



PLAN ABOVE ALTAR.



TOP FLOOR PLAN

Measured & Drawn by Ralph Surridge 1907.

PHOTO-LITHO. SPRAGUE & Co L.: 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

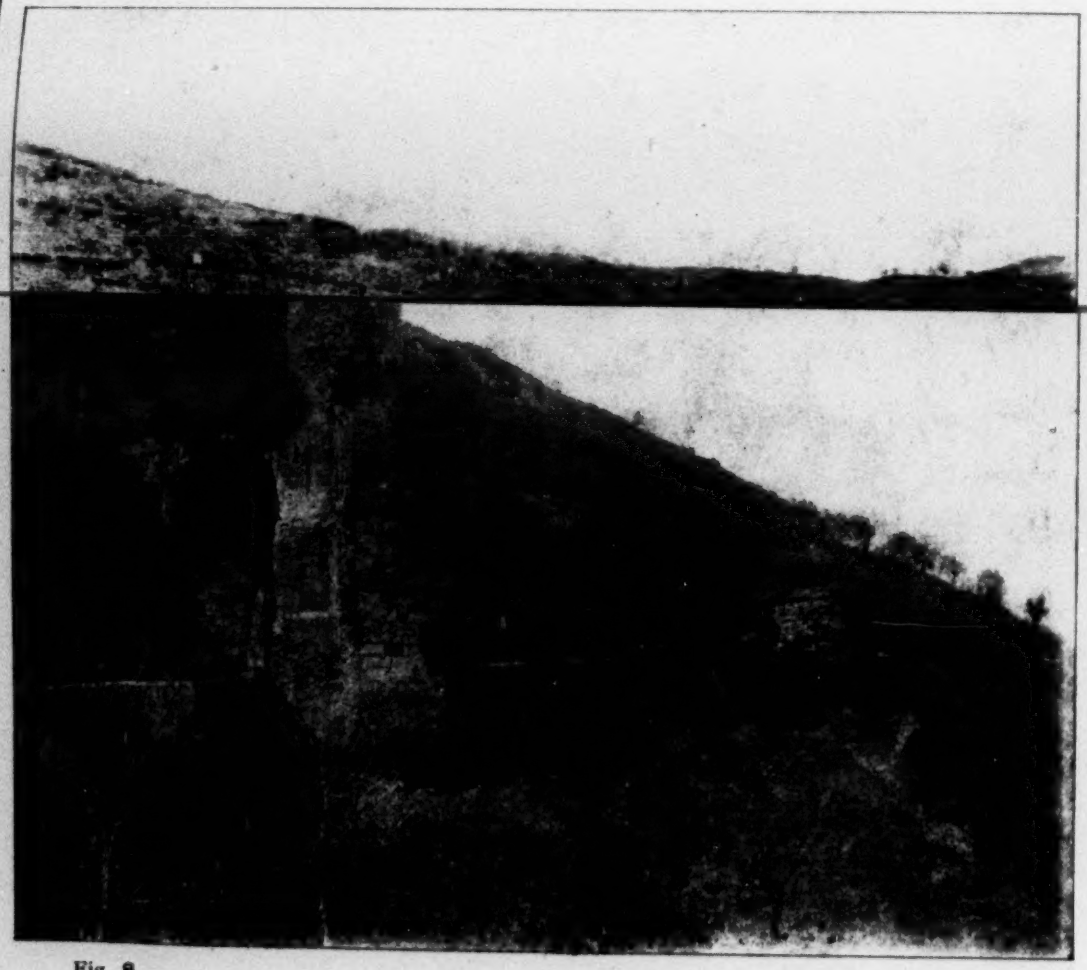


Fig. 8. PONTE DEGLI ARCI.

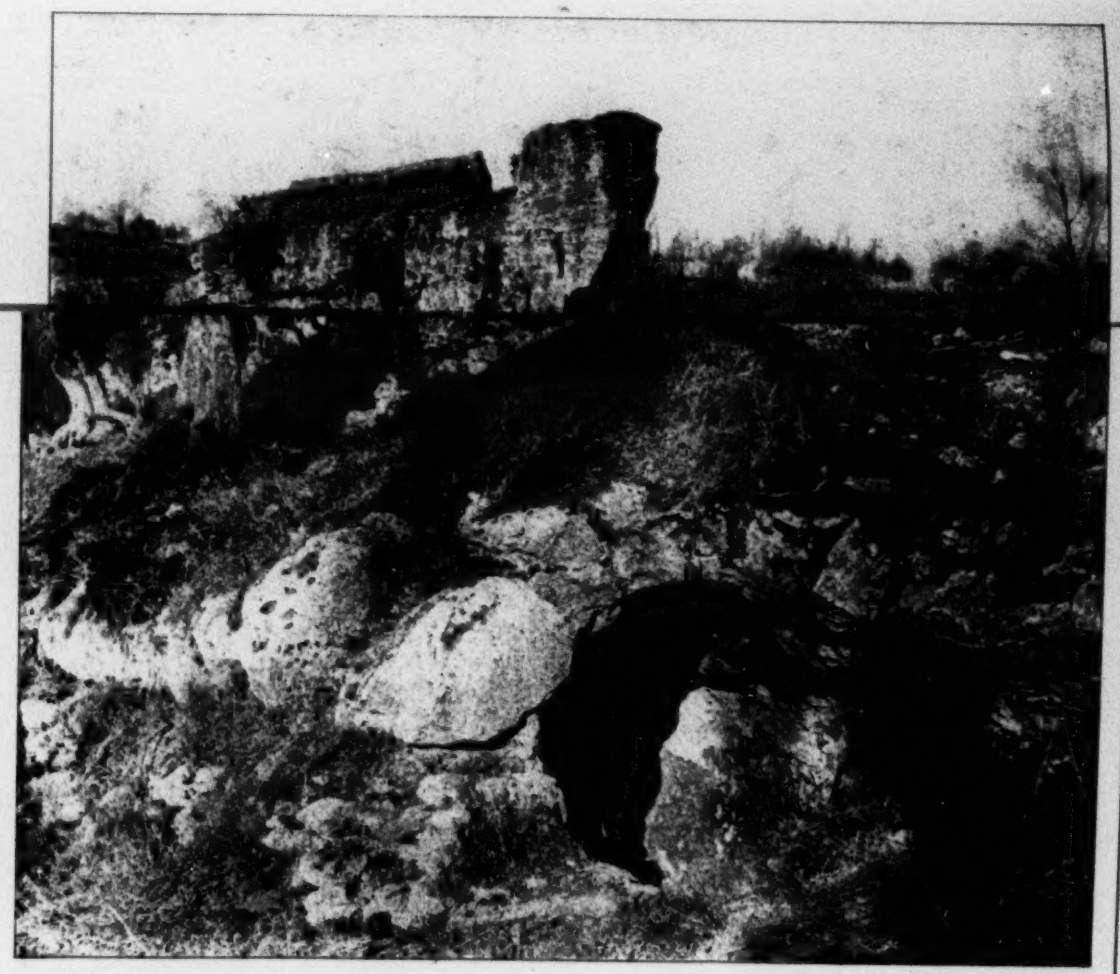


Fig. 9. SPECUS OF THE ANIO VETUS.

"INK-PHOTO" SPRAGUE & Cº LTD 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

ILLUSTRATIONS TO "AQUEDUCTS OF ANCIENT ROME."—PLATE I.

Fig. 4. ANIO NOVUS, FOSSO MAIURO.

Fig. 5. AQUA CLAUDIA, FOSSO MAIURO.

Fig. 6. AQUA CLAUDIA, VALLE D'EMPIGLIONE.

Fig. 7. AQUA CLAUDIA, VALLE D'EMPIGLIONE.

Fig. 8. PONTE DEGLI ARCI.

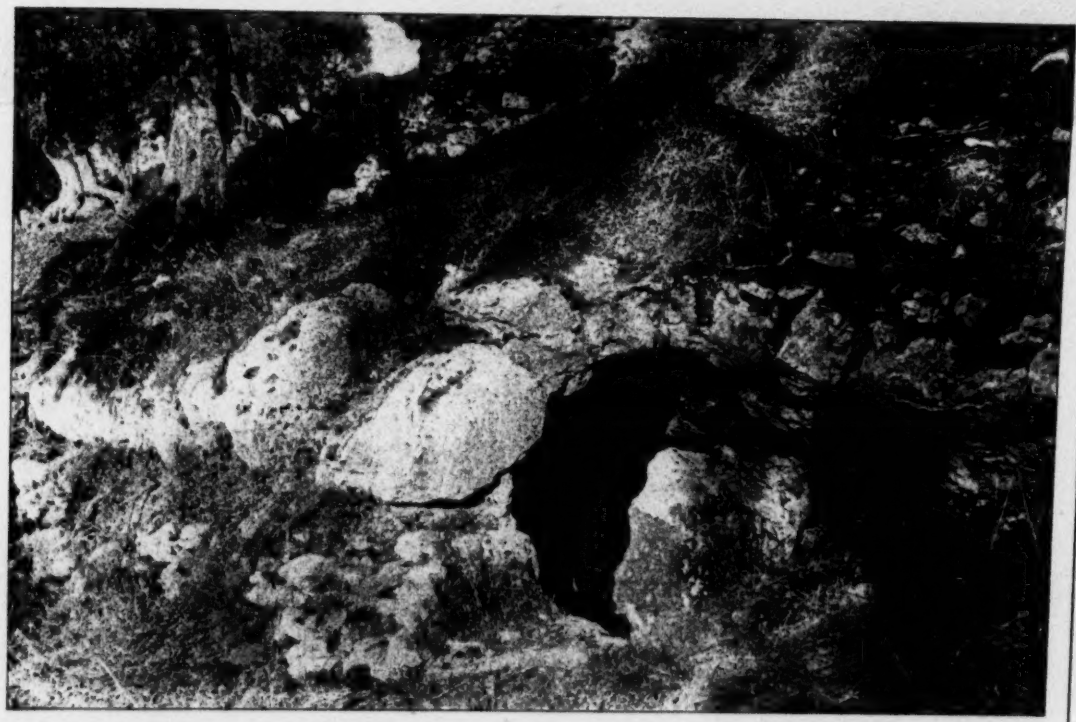


Fig. 9. SPECUS OF THE ANIO VETUS.

"INK-PHOTO" SPRAGUE & Cº LTD 4 & 5, FAST HARDING STREET, FETTER LANE, E.C.

ILLUSTRATIONS TO "AQUEDUCTS OF ANCIENT ROME."—PLATE I.

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* Review

AQUEDUCTS OF ANCIENT ROME.

THESE representations of remains of some of the Aqueducts of Ancient Rome are from photographs sent to us by Dr. Ashby as illustrations to his paper on the subject, on another page, and must be taken in conjunction with that.

CAMBERWELL SCHOOL OF ARTS AND CRAFTS.

IN an official memorandum issued in connexion with the exhibition of students' work at this school the object of the school is stated to be "to provide instruction in those branches of design and manipulation which directly bear on the more artistic trades, and also to give facilities for practice in those details of their craft which, owing to subdivision of processes of production, craftsmen are unable to obtain in the workshop. The industrial application of design in relation to each particular craft is especially studied." The work that has been shown there during the last fortnight is evidence of this object having, in the main, been kept in view by the various instructors, and also by the students themselves, and of much hard work all round. Compared with the exhibition of 1907,* there is improvement in some directions, with perhaps a falling off in others. We cannot here attempt a proper appreciation of the work of the individual students, but only a general review of the exhibits, having regard to our article on the last exhibition.

The exhibition is again strong in bookbinding and in book illustration and lettering. Indeed, there are many exhibits of quite first-class excellence in this section, and it must be gratifying to the staff to find their students' work receiving recognition at the hands of publishers and others, for we noticed more than one work under the publisher's name and with the source of the design properly recognised on the title-page. The studies in decorative design evince a more thorough and consistent study of nature than we were able to note last year; much of the drawing is good, and the incursions into the field of colour will doubtless improve. The stained glass is hung, or set, to advantage, the blazoned shield, with visor, mantling, and crest, all on a field of diamond panes, is particularly successful in the management of the leading. There is the inevitable full-length portrait figure (of Wm. Morris) which compares most unfavourably in quality of glass, colour, and drawing with the smaller heraldic panels near it.

In carving—except in the way of picture-frames—there is again nothing worthy of the name save a piece of "vine" foliage freshly cut in alabaster, and we trust it may be that the specimens shown do not adequately represent the year's work in this particular.

For the examples of cabinet-making we have nothing but praise. The sense of refinement in design and moulding, the workmanship and the finish of a small mahogany sideboard are thoroughly good; we could, however, have wished for either a *straight* line or a more definite *curve* to the front of the top. The author of the corner cupboard will doubtless improve in his—or her—work another year. There is some good modelling and bas-relief work from the life and from well-known examples in the South Kensington Museum. But for practical plastering we regret to see that the custom of setting up scale models of badly-designed "architectural" subjects is still in vogue, while there is even less than last year of characteristic modelling as distinguished from *models*. There is a sound piece of stone-cutting in the shape of a Late Gothic ogee cusped lead or niche canopy: could not this or another student be encouraged to *carve* the crockets against the exhibition of another year? A good model in stone is shown for the pendentive construction of a small dome. If the material used in the jointing of this model would permit its being readily taken to pieces it would serve a useful purpose for class demonstrations. The model of a circular arch and a quadrant on plan, with face of piers at right angles to each other forming a kind of angle doorway, is scarcely less than a freak in masonry, and anything but a worthy object for all the careful work put into it by the student. Examples of circular-cutting can be found which do not entail distortions of this kind. There is an alabaster model to about 1½ in. scale of a two-light XIVth-century Gothic window with tracery head. The tracery and containing arch has no joint from springing line to apex. Be the tool-work never so good, ought a student to be thus allowed to render Gothic architecture? In the way of architecture, indeed, we cannot help thinking that too much is attempted at Camberwell. The subjects are for the most part too ambitious. A technical institute, a town or suburban church, or a large house are beyond the student's handling altogether. Greater pleasure and more self-encouragement would come from less ambitious efforts. The instructors would then be able to give the much-needed guidance in the essentials of reasonable planning and the elements of passable architecture and sound construction, which is scarcely possible with the type of subject above noted.

* Reviewed in our issue of January 26, 1907.

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held on Tuesday in the County Hall, Spring-gardens, S.W., Mr. H. P. Harris, Chairman, presiding.

Improvements.—The Improvements Committee recommended the expenditure of 30,000*l.* in respect of the widening of Hammersmith Broadway; 6,500*l.* in respect of the paving, etc., works connected with the Brook Green-road and Scrubs-lane improvement; and 19,000*l.* in respect of the improvement at the Marble Arch.* The proposals were agreed to.

The Chairman, Lord Elcho, in submitting the Marble Arch improvement scheme, said that great credit was due to Mr. F. W. Speaight, the originator of the scheme, to the Office of Works, and to others, in the work they had done in connexion with the matter.

Schools.—It was agreed that the estimate of expenditure on capital account of 34*l.*, in respect of taking out and lithographing quantities in connexion with the erection of a manual training centre for twenty boys, and centres for teaching laundry and housewifery, which adjoins the site in Berner-street (St. George-in-the-East), be approved.

That the estimates of expenditure on capital account of 155*l.* and 121*l.* respectively, in respect of taking out and lithographing quantities in connexion with schemes of structural improvements proposed to be effected at the Laxon-street (Bermondsey) and Teesdale-street (Bethnal Green, N.E.) schools, be approved.

Lectures.—The following recommendations were agreed to:—

That a course of three lectures on magazine and newspaper illustration be given at the London County Council School of Photo-Engraving and Lithography in the session 1907-8. The lectures will be delivered by Mr. P. V. Bradshaw.

That two courses, each consisting of four lectures, on heraldic design be given at the London County Council Hammersmith School of Arts and Crafts and the London County Council Putney School of Art respectively, in the session 1907-8. The lecturer will be Mr. G. W. Eve.

Widening of Fleet-street.—It was agreed that payment of 4,990*l.* 11s. on account of the Council's contribution towards the cost of the widening of Fleet-street at Nos. 53, 68, and 69 by the Corporation of the City of London, be approved.

Southern Outfall Sewer Enlargement, Sections C and D.—The Main Drainage Committee reported as follows:—"We have to report the completion, by the Westminster Construction Company, Ltd., of their contracts for the construction of sections C and D of the southern outfall sewer enlargement, being that portion between Deptford and White Hart-lane, Woolwich. The actual cost in the case of section C has amounted to 77,267*l.* 3s. 7d., or 4,013*l.* 15s. 5d. less than the contract sum. In the case of section D, the actual cost is 313,786*l.* 19s. 3d., showing a saving of 34,629*l.* 14s. 4d. upon the contract. In connexion with the latter work, it was found possible, owing to the favourable nature of the strata through which the sewer was constructed, to make certain alterations in the construction with the result that a reduction was made in the cost of the work."

Lack of Employment.—The Parks and Open Spaces Committee reported that on December 10, 1907, the Council decided that certain works at parks and open spaces under its control should be offered to the Central (Unemployed) Body for London for execution during the present winter. The Central Body has since undertaken the works upon the conditions approved by the Council, and has expressed a desire that opportunity may be afforded for the employment of more men on other similar works. The Committee accordingly prepared a list of additional works, consisting chiefly of digging, levelling, and re-turfing, which would in the ordinary course have to be carried out in the near future, and it was estimated that employment could thus be given to about 565 men for nearly twenty weeks, but a larger number of men can be employed at any time should the Central Body desire so to arrange. The conditions, as approved by the Council on December 10, 1907, under which the works may be undertaken by the Central Body, provide that the amount of co-operation in cost on the part of the Council shall be such as is certified by the Council's officers to be the fair value of such work. The Committee recommended, and it was agreed:—That the estimate of expenditure on maintenance account in the financial year 1908-9 of 2,665*l.* . . . in respect of works which may be undertaken by the Central (Unemployed) Body for London for execution at the undermentioned parks and open spaces, be approved, viz.: (i.) South-west district—Battersea Park, Brockwell Park, Streatham Common, Tooting Common, Wandsworth Common, and Wandsworth Park. (ii.) South-east district—Avery Hill, Eltham Park, Hilly Fields, Ladywell Recreation-ground, and Ruskin Park. (iii.) North-west district—Hampstead Heath and Wormwood Scrubs. (iv.) North-east district—Clissold Park, Finsbury Park, Hackney Marsh, Hainault Forest, Highbury Fields, London Fields, Shandy-street Recreation-ground, Springfield Park, and Stoke Newington Common.

Iron and Glass Shelter, Strand.—The Building Act Committee recommended that permission be granted to Mr. H. J. Cope, acting for The Cabins, Ltd., for the erection of an iron and glass shelter in front of the entrance to the restaurant of the Cabins, 352 and 353, Strand.

Mr. Jephson moved that the recommendation be referred back. The Council, he said, had spent thousands of pounds on the improvement of the Strand, and he protested against its disfigurement by these shelters.

Mr. E. Smith seconded.

Speaking in support, the Deputy-Chairman (Capt. Hemphill) pointed out that if a comparatively small restaurant were allowed to erect a shelter it would be difficult to refuse permission to other similar establishments in Piccadilly and elsewhere. The result would be shelters all over London.

Only nine members, however, voted for the amendment, and the recommendation was agreed to.

Having transacted other business, the Council adjourned.

* Referred to in our last issue, see page 89.

APPLICATIONS UNDER THE LONDON BUILDING ACT, 1894.

THE London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—

Lines of Frontage and Projections.

Holborn.—Projecting illuminated sign in front of the Kingsway Theatre, Great Queen-street, Holborn (Mr. A. Penley for Miss Lena Ashwell).—Consent.

Marylebone, East.—A deviation from the plans approved for the erection of porches and balconies to six blocks of residential flats in Glentworth-street, St. Marylebone, so far as relates to an increase in the length of the balconies at the south-western corner of block K (Messrs. Hudson & Hunt).—Consent.

Norwood.—Buildings on the western side of Brixton-hill, Brixton, and the northern side of Cornwall-road (Mr. W. Newton Dunn).—Consent.

Strand.†—An iron and glass shelter in front of the entrance to the restaurant of The Cabins, Ltd., Nos. 352 and 353, Strand (Mr. H. J. Cope for The Cabins (1901), Ltd.).—Consent.

Wandsworth.—Bay windows to two houses on the southern side of Birchwood-road, Wandsworth (Mr. E. F. Baverstock).—Consent.

Width of Way.

Greenwich.—A transformer chamber at Castle's Wharf, River Bank, Anchor and Hope-lane, Charlton, with external walls at less than the prescribed distance from the centre of the roadway of River Bank (Mr. J. Stanley Heath for Messrs. Castle & Sons).—Consent.

Hampstead.—A motor-house at the rear of No. 4, Primrose Hill-road, Hampstead, at less than the prescribed distance from the centre of the roadway of Ainger-mews (Messrs. C. Tavener & Son for the Trustees of the late T. Melbourne).—Consent.

Width of Way and Space at Rear.

St. Pancras, South.—A further deviation from the plans approved for the erection of buildings upon a site abutting upon Tottenham Court-road, Fitzroy-court, Whitfield-place, and Warren-street, St. Pancras, so far as relates to the construction of windows at the ground floor level in the shops on both sides of Fitzroy-court (Messrs. Seth-Smith & Monro for Mr. C. E. B. Young).—Consent.

Clapham.—That the Council, on the application of Mr. J. W. Mead, do extend the licence in respect of the temporary cycle-house in front of No. 22, Sisters-avenue, Battersea, for a period of one year.—Consent.

Lines of Frontage and Construction.

Greenwich.—The construction and erection of a wood and iron gantry at the rear of the Delta Metal Works, Tunnel-avenue (late Blackwall-lane), Greenwich, and extending over the public footway on the eastern side of the River Thames (The Delta Metal Company, Ltd.).—Consent.

Hackney, North.—The retention of four buildings of a temporary character at the rear of No. 138, Stoke Newington-road, Hackney, with three of such buildings abutting upon Farleigh-road (Mr. A. Dixon).—Consent.

Space at Rear.

Westminster.—A modification of the provisions of Part V. of the Act as to the extension above the diagonal line directed to be drawn by sect. 41 of that Act, so far as relates to the erection of Ashley House upon the site of Nos. 252, 254, and 256, Vauxhall Bridge-road, Westminster (Messrs. Palgrave & Co for the Central London Estates, Ltd.).—Consent.

Uniting Buildings.

Bethnal Green, North-East.—A modification of the provisions of sect. 77 of the Act so far as relates to the uniting of No. 5, Parmiter-street, Bethnal Green, with No. 222, Cambridge-road (Messrs. H. Dawson & Son for Mr. Amos Sanders).—Consent.

Hoxton.—A modification of the provisions of sect. 77 of the Act, so far as relates to the retention of the first and second floors, between Nos. 1, 2, 3, and 4, Britannia-street, and Nos. 1, 3, 5, 7, and 9, Provost-street, City-road, Hoxton (Messrs. M. W. King & Sons for Mr. J. Kent).—Consent.

Buildings for the Supply of Electricity.

Hammersmith.—That the application of Mr. C. W. Bennett, for an extension of the periods within which the erection of two cooling-towers at the Wood-lane generating-station of the Kensington and Notting Hill Electric Lighting Companies, Hammersmith, were required to be completed, be granted.—Consent.

Means of Escape and Cubical Extent.

Strand.—That the Council do consent to a deviation from the plans approved for the erection of a new building for the *Morning Post*, to abut upon Aldwych, Wellington-street, and Exeter-street, Strand, so far as relates to the provision of a doorway with a self-closing fire-resisting door in the wall between the timekeeper's office and the entrance lobby at ground floor level at the head of the stairs from Wellington-street to the basement (Messrs. Mewes & Davies).—Consent.

The recommendation marked † is contrary to the views of the local authorities concerned.

Architectural Societies.

MANCHESTER SOCIETY OF ARCHITECTS.—The sixth general meeting of the students of this Society was held on the 21st ult., presided over by Mr. Isaac Taylor. Mr. J. C. Ainsworth, B.A., read a paper on "Cistercian Monasteries." The lecturer first traced the evolution of the Cistercian Order, showing how the influence and wealth of the Benedictines had led to great abuses, how the abbot was in many cases rather a feudal lord and warrior than a monk. He then gave a short account of the foundation of the Cluniac and Cistercian orders, how they assisted in the rehabilitation of agriculture by reclaiming swamp and forest, and how they, too, after attaining great power and influence, departed from the precepts and rules of their predecessors, and sank into decay. Mr. Ainsworth next gave a short description of the normal XIIth-century Cistercian monastery, dealing first with the church, and then taking the buildings round the cloister, and describing their arrangement and purpose. He pointed out the great uniformity which exists in the plans of all Cistercian monasteries—the refectory with its axis north and south; the domus conversorum peculiar to this Order, etc. The paper was illustrated by a number of lantern slides.

ULSTER SOCIETY OF ARCHITECTS.—The annual dinner in connexion with the Ulster Society of Architects was held on the 27th ult. in Ye Olde Castle Restaurant, Belfast. Mr. J. J. M'Donnell (President) occupied the chair, supported by Messrs. G. P. Gardner (President Ulster Arts Society), R. B. Henry (Deputy-President Belfast Builders' Association), Atcheson Ferguson (President Belfast Quantity Surveyors' Society), and others. The loyal toast having been honoured, Mr. Robert M. Young proposed "The Learned Professions," President Hamilton responding. Having referred to the honour recently conferred upon the Right Hon. Robert Young, he said he recollected that their mutual friend, Mr. Gilliland, appeared before Lord Robertson's Commission in April, 1902, when it sat in Dublin, and he distinctly recalled the evidence he gave on that occasion on their behalf, pleading for the establishment of either a diploma or degree in architecture. He said very truly that in Queen's College there was at present every chair necessary for the training of future architects with one exception, and that one exception was a chair of architecture proper. Mr. Gilliland outlined the course which he thought was necessary for a candidate for such a diploma or degree, and he thought he carried conviction to the members of that very learned and painstaking Commission. Some six years had passed since then, but Mr. Gilliland's representations on their behalf had never been lost sight of by the College, though it had not been in their power to carry them into effect. Nothing would give them in Queen's College greater pleasure when they had the power, be that sooner or later, than to give effect to the wishes of the Ulster Society of Architects. He quite agreed with them that the establishment of such a diploma or degree and the provision of a definite course for young architects would raise the status of their profession in Belfast and throughout the province of Ulster, and he was equally certain the general public would be benefited to an equally great extent. Dr. M'Caw (President of the Ulster Medical Society) and Professor Fitzgerald also responded. Mr. W. Hartley Patterson proposed "Our Guests," coupled with the names of Mr. G. P. Gardner, Mr. R. B. Henry, and Mr. Atcheson Ferguson. Mr. Ferguson, in replying, said he had noticed from the report of the last meeting of their Society that there were some complaints with regard to Corporation work, and that they wished the Builders' Association to join with them. He had been pleased to state that his Society would give any assistance they could, and he now repeated that they were willing to join with the Ulster Society of Architects and the Builders' Association in any action they might take. Mr. Gardner said the Ulster Arts Society had already made itself felt. Their purpose was to foster art in Belfast, and in that they were very closely allied with the Ulster Society of Architects. They and the Ulster Arts Society felt they had a difficulty to fight owing to the prevailing spirit of commercialism, which demanded the biggest article for the least money. But by lectures and papers they hoped to stimulate members and friends, so that they might be better able to educate their neighbours. Mr. Henry said, with regard to what had been said about the Corporation and municipal trading, he thought that that was a thing to be deplored. Taxes and rates were going up, and no sooner did a man start building than he had to think of taxes, which was a cause of great stagnation in trade. One of the principal things in connexion with municipal trading was that the Corporation seemed to think they could do the work cheaper, and the abortions that resulted in the street were terrible, while as to the cost nobody knew what it was. Mr. Gilliland proposed the health of Mr. W. B. Fennell, and on behalf of the members presented him with a gold chain and match-box as a token of their esteem and affection. He said Mr. Fennell had severed his connexion with them, but while he was with them he was a most valued member, and acted as hon. secretary for two years during his (Mr. Gilliland's) presidency. They had in recognition of his services elected him an hon. member. The toast was cordially received, and Mr. Fennell suitably replied.

Engineering Societies.

THE INSTITUTION OF CIVIL ENGINEERS.—The Council of the Institution of Civil Engineers have made the following appointments to scholarships under the Yarrow Educational Fund:—Fred. Harrison (to assist him to take a course of apprenticeship to Messrs. Heenan & Froude, of Manchester); G. E. Morgan (to assist him to follow a course of study at the Royal College of Science); Frederick Hickey (to assist him to follow a course of study at the Royal Naval College, Greenwich); C. O. C. Reilly (to assist him to take a course of apprenticeship to an engineering firm); J. J. Elliott (to assist him to take a course of apprenticeship with sessional study at the East London College); D. D. Forbes (to assist him to take a course of apprenticeship with sessional study at the East London College; and H. W. Turner (to assist him to follow a course of study at the Royal College of Science). Applications for these scholarships have to be made in accordance with regulations, copies of which and further particulars may be obtained from the secretary, Dr. J. H. T. Tudsbery, at the Institution of Civil Engineers, 25, Great George-street, Westminster, S.W. No further appointments to scholarships under this fund can now be made until the autumn of 1910.

JUNIOR INSTITUTION OF ENGINEERS.—At the last meeting of this Institution, held at the Society of Arts, the chairman, Mr. F. R. Durham, presiding, a paper on "The Conduit System of Electric Tramway Construction and Recent Improvements" was read by Mr. Fitzroy Roose, of the London County Council Engineer's Department. The salient features of the original line from Westminster to Tooting were first briefly described, and the differences between them and the present system of construction were dwelt upon at length. The extended yokes which were now used, besides carrying the slot rails, formed anchors to which the track rails were fixed at intervals of 7 ft. 6 in., and would be found of great advantage when renewals of track rails had to be carried out. A cast-iron plate now formed the cover to the insulator pockets, instead of cast-iron boxes as previously, which as they became worn by traffic had to be replaced, and were also the cause of a great deal of dirt getting into the conduit. Drainage, insulators, cable connectors, etc., were dealt with, and special work at cross-overs and junctions, and insertion of junctions during reconstruction were referred to. The side slot system was touched upon, as also the electrical supply to the line. A description was given of the plough or collector, and in conclusion the following figures were cited as the cost per mile (single) of the respective systems, including special work—as pipe diversions, etc.:—Conduit, 17,000*l.*; surface contact, 9,700*l.*; overhead, 9,200*l.* An

animated discussion followed, in which Messrs. L. H. Rugg, F. D. Napier, H. C. King, W. De Ritter, C. Singleton, R. Marshall, E. Boult, A. Millar, A. Marshall, C. H. Smith, P. Brown, and the Chairman took part.—On the following Saturday afternoon, as a supplement to the paper, by permission of Mr. Maurice FitzMaurice, Chief Engineer to the London County Council, an inspection was made of the reconstruction work in progress in Stockwell-road, the members being shown over by the Resident Engineer, Mr. Alex. Millar, and the author. The method of forming the concrete conduit by means of the improved sheet-iron centring, the process of inserting the copper connecting-pieces between the lengths of conductor-bars, the insertion of the insulators and manner of carrying out other special work was demonstrated. The members, conducted by Mr. J. Bowden, Rolling Stock Superintendent, afterwards proceeded by one of the latest types of cars, Class EI, to the sheds at Clapham High-street. Switched off the main track, the car was run into the shed on to the electric traverser, and moved thereon to illustrate the method of bringing the cars into their place in the depôt. The motor school, where the drivers are instructed in the manipulation and operation of the controllers, brakes, etc., was then shown, much interest being manifested in the skeleton stationary and working car. All the leads, etc., for traction and lighting being visible, the men can be readily taught how the various connexions are made. The sub-station was also seen, containing three motor generators (a fourth is now being erected). Delivered at a pressure of 6,600 volts from the generating-station at Greenwich, the three-phase alternating current is transferred to 550 volts continuous for use on the lines. About five miles of double track are fed from the station.

Books.

Lockwood's Builder's, Architect's, Contractor's and Engineer's Price-Book for 1908. Edited by FRANCIS T. W. MILLER, A.R.I.B.A. (London: Crosby Lockwood & Son, 7, Stationers' Hall-court, Ludgate-hill, and 121A, Victoria-street, Westminster. 1908.)
Laxton's Builder's Price-Book for 1908. Originally compiled by WILLIAM LAXTON. Ninety-first edition. (London: Kelly's Directories, Ltd., 182, 183, and 184, High Holborn, W.C.)

IT is difficult to award the palm for excellence or thoroughness to either of these works, as each has attained a well-deserved reputation. The former is the younger of the two, but it is a most promising junior, and there is little doubt that healthy competition has had a beneficial effect upon both, so that the user of price-books has now something worthy of the name to refer to, in striking contrast to the state of things some twenty years ago, when the only variation from one edition to another was the date.

The state of trade remaining in the depressed condition that it has been for the past year or two has not made much in the shape of revision necessary, although "Lockwood" in particular bears evidence of a careful examination in slight revisions throughout. A rather striking discrepancy between the two works is in the price of bricks as a basis for the cost of brickwork, "Lockwood" taking 30s. per M, while "Laxton" takes 37s., although the note as to rate of deduction or addition according to the price of the bricks makes the cost of brickwork approximately the same. This is as it should be. "Lockwood," in the price for "Labour and Mortar," has rather over-revised, by which means a somewhat glaring error has crept in. After stating that price for "Labour only" includes for profit only, and that "Labour and Mortar" includes for scaffolding at 4s. per rod, in the column for "Labour and Mortar" 4s. only is added to the former price, the effect being that nothing is included for mortar. At any rate, that is how we read it.

We would again call attention to the vexed question of discounts. We are aware of the difficulty of getting at these for some items, but we think that in those cases where stock "list prices" are the rule, any variation being shown only by the discount, they should be mentioned—*e.g.*, both these volumes give "list prices" of drain pipes, but whereas "Laxton" mentions a profit of 40 per cent., "Lockwood" is silent; but, strangely enough, while up to 6 in. the prices are identical, above this size "Lockwood" ranges from 7 per cent. to 25 per cent. lower than "Laxton." On the other hand, in that anomaly, the price list of gas pipes and fittings, "Laxton" mentions the discounts ranging from 45 per cent. for galvanised to 67½ per cent. for ordinary; while "Lockwood" merely mentions the fact that they are "list prices," and that fixing should be charged extra as day work. We have no doubt that gasfitters would most willingly take on work at these terms. These are small matters, but certainly worthy of the consideration of the editors.

It is hardly fair perhaps to make an extensive comparison of the prices of similar items in the two books, but such a comparison would provide an interesting occupation for an idle half-hour. What we have done in this way bears out the experience in dealing with the priced bills of different builders where the totals are very close, but the differences in detail very striking, although all may be priced by estimators of equal ability. This, we presume, will be the case so long as estimating in its present form exists, but it serves to show the limitations in the use of a price-book, however good, in selecting isolated items. At the same time, credit is due to both works for completeness, and for a most painstaking effort to make them as useful as it is possible for such works to be.

Electric Wiring and Fitting for Plumbers and Gasfitters. By SYDNEY F. WALKER, M.I.E.E., etc. (London: Scott, Greenwood, & Son.)

THIS book is written with a meritorious object. The author has attempted to give the necessary information to skilled workmen like plumbers and gasfitters which will enable them to wire buildings for the electric-light in a satisfactory manner. He points out that this class of man is much more likely to make a satisfactory job than many of the men employed by wiring contractors.

The book is divided into five chapters. The first is introductory. The author does not trouble the reader with metaphysical subtleties, contenting himself with saying that pressure and current mean exactly the same in electricity as pressure and flow do when we talk about gas or water. Electrical resistance is to electricity what "weight and friction are in mechanics." In this way the workman gets his theoretical basis. Chapter II. gives data about the insulation of wires and cables, but much of the information given at the beginning of this chapter is of little use to the electrical wireman. The concluding portion gives a description of the methods recommended by the various manufacturers for making joints. Parts of Chapter III. on fixing the wires and cables will be useful. A diagram of the wiring in an ordinary house would enable the reader to understand this chapter much better. Chapters IV. and V. on lamps, switches, etc., are not very instructive. The workman would probably pick up knowledge much more easily from a maker's catalogue.

Plumbers who read this book will probably resent the author's continually dragging in references to their handicraft:—"Wood, as plumbers are well aware . . ."; "It will be no news to plumbers . . ."; etc. If the facts mentioned were recondite it might please them, but in nearly every case it would be difficult to find anyone who was ignorant of the facts quoted.

We doubt the advisability of printing the following *résumé* for restoring life after an apparently fatal shock (p. 111):—"Shortly, they consist . . . , or in another method, pulling the tongue out and pushing it back again until the blood is revivified, and the heart commences to beat."

The following complaint about electric meters is most extraordinary (p. 152):—"All forms of meter absorb a certain quantity of electricity in starting when lights are turned on, say, in the evening for the first time, which the consumer has to pay for; but it is claimed that in the latest forms of meter this charge is very small, only 2 per cent. of the current, and for a very short interval." To the present reviewer, who has had several years' experience of testing "disputed" electric meters of all kinds, this seems to be nonsense. There are several books published on "electric wiring" which would, in our opinion, be more useful to the workman.

Northampton—With Its Surroundings. By S. S. CAMPION. (London: The Homeland Association. 1907.)

ARCHITECTURALLY the town of Northampton is remarkable for possessing three fine churches—the parish church of All Saints, with a fine Classic portico built against a XIVth century tower; St. Sepulchres, one of the four circular churches of the Templars; and Norman work of exceptional beauty in the west front and arcades of St. Peter's. In addition is an interesting chapel formerly attached to St. John's Hospital, now a Roman Catholic place of worship; and last, but not least, one of the few remaining Eleanor Crosses, in comparatively good preservation. In the neighbourhood are the interesting houses at Althorp, the seat of the Spencer family, and Castle Ashby, and the curious early tower of Earl's Barton Church. All these, with many other points of interest, are fully described and well illustrated in this guide to town and district.

Nunburnholme: Its History and Antiquities. By REV. M. C. F. MORRIS. (London: Henry Frowde; York: John Sampson. 1907.)

THIS work of rather over 300 pages is an example of local history thoroughly well done, and the chapters that deal with the history, field names, dialect, and geology of this little Yorkshire village all bear evidence of much thought, care, and scholarship. It will probably have many readers beyond the limits of the district of which it treats and in counties outside Yorkshire, and might well be taken as a model for other works of a like nature. The church, of which a couple of photographs are given—and of which we should have liked to see a plan and some drawings of details—is small in scale and simple in form, but its chancel has some good decorated windows, and there are evidences of the earlier building in the Norman arch between the nave and tower, the latter, though new, having been built on the lines of the old foundations. During the process of rebuilding the shaft of a very remarkable cross, decorated on all four sides with figure sculpture of Scandinavian type, was found, and a description by Mr. Romilly Allen and good photographs of the four sides are given. There are besides chapters on a small Benedictine nunnery now destroyed, appendices dealing with the descent of the manor and charters, an index, and a good map of the parish.

Transactions of the St. Paul's Ecclesiological Society. Vol VI., Part II. (London: Harrison & Sons. 1907.)

THERE are four papers in this part, including one on St. Peter's Church, Cornhill, and an interesting list of London church bells and their founders, with illustrations of founders'

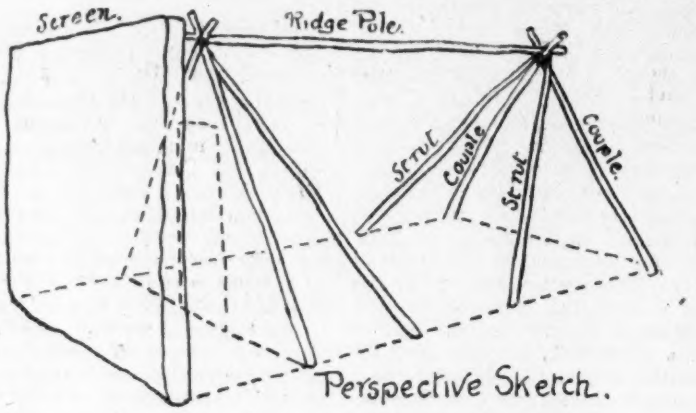
marks. Three good photographs of Stoke, Seal, and Hunton churches illustrate extracts from a valuable paper by Mr. Duncan on some dated examples of Kentish churches, from materials derived from local wills, which seems deserving of a fuller report.

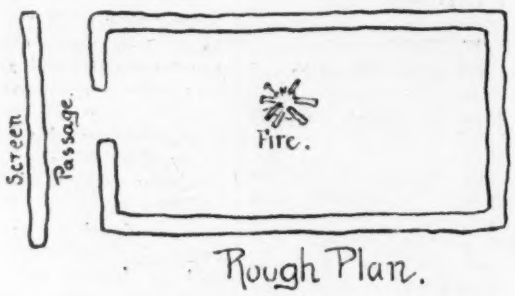
Correspondence.

A SUGGESTED ORIGIN OF THE MEDIÆVAL HALL.

SIR,—While preparing some notes for a few short papers on "English Architecture" which are being published by Messrs. Nelson & Son, it occurred to me that some of the prominent features of the typical English hall of the XIIIth and XIVth centuries have their prototypes in the primitive huts of this country. My ideas are not, I suppose, entirely original, but some details, I think, are.

The pre-Conquest hut of the villein, constructed of couples and ridge-pole (usually about 16 ft. long) could be stiffened readily by braces (as in sketch). Perhaps these braces





are the originals of those found in Gothic roofs.

As these structures were covered with brushwood, plastered with clay, it is natural to have the entrance at one end. Then, nothing is more natural, to secure some degree of privacy, to say nothing of protection from weather, than for the owner to erect a screen of the same brushwood in front of the entrance. On referring to the sketch plan, it will be seen how very like this arrangement is to that of the mediæval hall with its passage, screened off at one end, joining the two doors. The *two* doorways in the screen of the hall doubtless were made for convenience and perhaps comfort.

WM. HY. ELGAR.

SAFETY OF CHIMNEY-STACKS.

SIR,—Given the height and girth of a square chimney-stack, what is the maximum safe movement in a gale of wind—first, at the top; second, halfway up; third, one-fourth up? Would the safe movement be greater or less if the chimney were of other section—say, round or hexagonal?

I have made many inquiries, but, beyond a confirmation of the general idea that some movement is necessary for safety, have met with no success. I shall, therefore, be greatly obliged if any of your readers can give me some definite information. W. H. BUNCH.

CONGREGATIONAL HALL, ALEXANDRA PARK, N.—The Congregationalists of this district have erected a church hall on a site in the Alexandra Park-road. The building will accommodate 550 people, and was designed by Messrs. Mummery & Fleming Williams, of Wood Green, the builder being Mr. Albert Monk, of Edmonton.

YORKSHIRE FEDERATION OF BUILDING TRADE EMPLOYERS.

THE tenth annual dinner of this Federation was held at the Royal Victoria Hotel, Sheffield, on the 22nd ult. Mr. Biggin, President of the Federation, was in the chair. The company included the Lord Mayor of Sheffield (Alderman Marsh), Mr. G. Macfarlane, of Manchester, Past-President of the National Federation of Builders, and a member of the Departmental Committee on Building Accidents; Mr. A. J. Forsdike, Treasurer of the Yorkshire Federation; Mr. A. W. Sinclair, of Scarborough, Past-President of the Yorkshire Federation; Alderman W. H. Jessop, of Huddersfield, Past-President of the National Federation; Councillor W. G. England, of Barnsley, junior Vice-President of the Yorkshire Federation; Mr. W. R. Thompson, of Dewsbury, senior Vice-President of the Yorkshire Federation; Mr. G. E. Powell, President of the Sheffield Builders' Association; Mr. C. F. Wike, City Surveyor of Sheffield; Councillor W. C. Fenton, President of the Sheffield Society of Architects and Surveyors; Mr. E. M. Gibbs, F.R.I.B.A.; Mr. J. Davidson, Secretary of the Yorkshire Federation; and Mr. Thos Smith, Secretary of the Sheffield Builders' Association. Mr. W. R. Thompson proposed "The National Federation of Building Trade Employers of Great Britain and Ireland." Referring to the formation of conciliation boards, he said several disputes had been amicably settled. Rules had recently been made for the prevention of accidents, and these had now been issued by the Home Office, and it would be for all local associations to carefully consider them. He was afraid to some extent they would hamper the trade, especially in minor repairs where in the making of expensive scaffolding and in other ways complying with these rules, they might have to spend more than they got for their work.—Mr. A. W. Sinclair, who first responded, spoke with pleasure of the strides the Federation had made during the past decade. As to the rules for regulating accidents, it was lamentable that there should be something like 150 scaffold accidents each year. No regulations could, of course, stop these, but it was possible to curtail them, and the trade should welcome the rules so that this death-roll might be largely decreased.—Mr. J. Dawson (Huddersfield), who also replied, said on the subject of accidents that the regulations should be welcomed by all who held human life sacred.—Mr. G. Macfarlane, who gave "The Yorkshire Federation," congratulated Mr. Biggin on his election to the Presidency. He did not know what to say about the building trade. He was not aware how matters stood in Yorkshire, but he knew that in Lancashire the members of his trade were waiting for the rising tide. The cost of materials was so high that people would not build, while the increase of rates, which now amounted almost to a second rent, had done a good deal to bring about this slump.—The President, in the course of his reply, said that the Yorkshire Federation was formed under the guidance of Alderman Jessop ten years ago, and it was intended to be a link in the series of federations which were to bind the trade from end to end of the country. The workmen had no feelings of animosity against the Federation, while by means of conciliation boards, strikes and disputes had been prevented which would have brought in their train much loss, suffering, and ill-feeling. Turning to the building trade, he said the cost of labour and materials had greatly increased, and were still showing an upward tendency. The Workmen's Compensation Act had increased the costs of insurance, and it was more than likely that they would be still further advanced. The new building regulations would mean an increase in cost of scaffolding and supervision of at least 10 per cent. He held the view that there should be some kind of examination for young builders before entering the trade. It would be better for the trade, better for architects, and better for the community at large.—Alderman Jessop submitted "The City and Trade of Sheffield," and the Lord Mayor, who replied, expressed the hope that it would not be long before the building trade felt the benefit of the better conditions of commerce and trade which had been experienced throughout the country during recent years. In Sheffield the decrease in building had not been great, because statistics showed that while during 1906 some 2,084 plans were passed, in 1907 the number was 2,034, or only fifty less.—Councillor England, in proposing "Architects and Surveyors," said the architects of to-day needed to be men of constructive skill, adapting themselves to new methods and exhibiting artistic ability whenever the opportunity offered itself.—Councillor Fenton acknowledged the toast. He said the organising of employers had had a beneficial effect—beneficial not only to members of the Federation, but also to architects and surveyors and to workmen engaged in the trade. His only complaint was that their organisation was not aggressive enough on the question of criticisms passed in regard to contract labour, as compared with direct labour. Speaking as a ratepayer, he was certain more contract labour would be to the advantage of the ratepayers. Another point; it was not desirable that public buildings in any town should be all erected from the plans of a city architect or surveyor, however able that man might be. It was better that they should have the views and ideas of a number of architects, and the public would desire this if they were earnest in their wish to see more artistic buildings. On the question of town planning, he expressed the hope that the matter would not be left in the hands of a body of laymen, but that it would be placed with some body who could co-opt men of experience, just as under the Education Act of 1902 education authorities were able to co-opt education experts, who had rendered valuable assistance in carrying out this important work. The concluding toast was "Our Guests and Visitors," proposed by Mr. A. J. Forsdike, and responded to by Mr. C. F. Wike, City Surveyor, and Mr. Bingham, Building Inspector to the Education Committee.

WESTMINSTER CITY COUNCIL.

AT the fortnightly meeting of the Westminster City Council on Thursday last week the following matters, amongst others, were dealt with:—

Buildings in Connaught-street.—It was agreed to inform Messrs. Pearcy, Tansley, & Co., Ltd., that the Council would have no objection to proposed alterations at Nos. 53, 55, and 57, Connaught-street, so long as an acknowledgment be paid in respect to eight windows overlooking property of the Council.

Post-Office Rebuilding.—Some discussion took place upon the letter received from the Postmaster-General inclosing plans showing a suggested rebuilding of the South-Western District Post-Office on land in Howick-place. The proposal involved building over the street which now separates the fire-station from the post-office. Eventually, on the motion of Capt. Jessel, it was agreed that the Council consent to the closing of the thoroughfare subject to the surrender of land and rounding off of the corner and straightening the frontage line of Howick-place by the Post-Office authorities.

Main Sewers.—In answer to the complaint of the City Council as to the inadequacy of the main sewers in Westminster and to the necessity of constructing a new deep-level sewer, the London County Council had written stating that a new low-level sewer which is now in course of construction from Hammersmith to Bow will pass through Westminster, and pointing out that until the effect of the new sewer is realised it is impossible to say whether any additional relief works should be carried out.

Suggested Widening of Prince's-street.—A letter had been received from Mr. A. R. Stenning suggesting that, as certain land was likely to be given up for the widening of

Prince's-street at its northern end, an opportunity occurred, now that the Wesleyan building was being proceeded with, of widening the street at the southern end by acquiring a strip of land at that spot. Sir John Wolfe Barry had written to the London County Council in similar terms. The Improvements Committee, while considering the widening a most desirable improvement, were of opinion that the cost was prohibitive, and it was agreed to so inform the correspondents.

Combined Drainage.—It was resolved to take no action on the Bill being drafted by the St. Pancras Conference with regard to combined drainage.

The Student's Column.

REINFORCED CONCRETE BEAM FORMULÆ.—V.

NOTATION AND ALGEBRAICAL FORMS (*concluded*).

(8) *Proposed Standard Notation.*—Table V. contains a code of standard notation embodying the features recommended in Sections (4) to (7). The following comparisons are made with the object of demonstrating the suitability and practical effect of the code here tabulated.

Although the notation adopted in the report of the British Reinforced Concrete Committee is limited to rectangular and T-beams with single reinforcement, it deserves appreciation as a stepping-stone in the direction of standard nomenclature.

Some of the symbols employed by that committee are more simple than those in Table V., one reason being that they refer to only two types of beam design, and another that some of them really stand for fairly complex expressions.

For example, it is very easy to say c = compression in concrete, and t = tension in steel, but to denote concrete and steel both in compression and in tension the addition of suffixes becomes absolutely necessary.

Again, while $(d\text{-}z)$, the arm of internal forces in beams of T-section, does not look formidable, the user will find on reference to the report that it actually implies a far more complex expression, since

$$(d-z) = \left[d - \left(\frac{d_1}{3}\cdot\frac{3kd-2d_1}{2kd-d_1}\right)\right]$$

The following formulæ, selected from the same report, are printed side by side in the original notation and in that of Table V. for the purpose of ready comparison :—

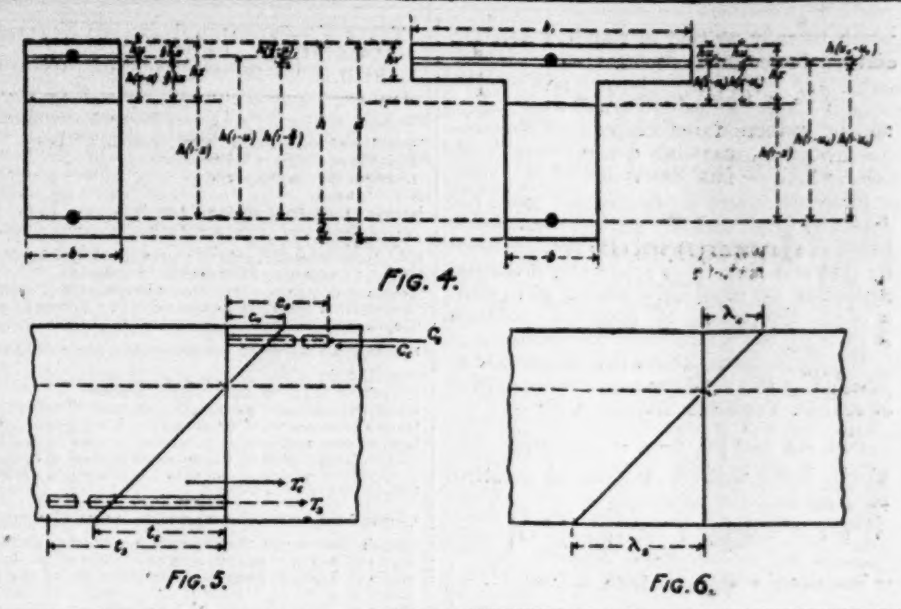


FIG. 4.

FIG. 5.

FIG. 6.

(*a*) BEAMS OF RECTANGULAR SECTION WITH SINGLE REINFORCEMENT.

	R.I.B.A. Notation.	Notation in Table V.
Total compression in concrete	$= \frac{1}{2}cbkd$	$C_c = \frac{1}{2}c_c bkx$
Total tension in steel	$= pbdt$	$T_s = \rho bM_r$
Ratio of depth of neutral axis and centre of tension in steel	$k = \sqrt{(p^2m^2+2pm)}-pm$	$x = \sqrt{(\rho^2m^2+2\rho m)}-\rho m$
Moment of resistance about the centre of tension in steel	$M = \frac{1}{2}A_c c\ (d-\frac{1}{3}kd)$	$M_r = \frac{1}{2}c_c x b h^2\left(1-\frac{x}{3}\right)$

(*b*) BEAMS OF T-SECTION WITH SINGLE REINFORCEMENT; DEPTH OF FLANGE LESS THAN DEPTH OF NEUTRAL AXIS.

	R.I.B.A. Notation.	Notation in Table V.
Mean compressive stress in the flange	$= \frac{1}{2}\left\{c+c\frac{kd-d_1}{kd}\right\}$	$= \frac{1}{2}\left\{c_c+c_c\frac{kx-hv}{kx}\right\}$
	$= \frac{c}{2}\cdot\frac{2kd-d_1}{kd}$	$= c_c\left(1-\frac{v}{2x}\right)$
Total compression in concrete	$= \frac{1}{2}b_1d_1c\frac{2kd-d_1}{kd}$	$C_c = c_c\left(1-\frac{v}{2x}\right)b_1hv$
Depth to centre of compression in concrete	$z = \frac{d_1}{3}\cdot\frac{3kd-2d_1}{2kd-d_1}$	$hu_c = h\frac{3xv-2v^2}{6x-3v}$
Moment of resistance about centre of tension in steel	$M = \frac{1}{2}b_1d_1c\frac{2kd-d_1}{kd}(d-z)$	$M_r = c_c\left(1-\frac{v}{2x}\right)b_1vh^2(1-u_c)$

These examples show that there is no essential difference between the two systems of notation so far as concerns the symbols in most general use. The advantage of such symbols as A_t and A_c is not very apparent, in view of the simple form to which the expression for M_r can be reduced under the ratio system of notation.

In the following comparison we see the simplicity attainable by substituting the ratios v and u_c for the absolute measurements d_1 and z. Writing in full the equation for the moment of resistance according to the notation of the British Reinforced Concrete Committee we have

$$M = \tfrac{1}{2}b_1d_1c\,\frac{2kd-d_1}{kd}\left\{d-\frac{d_1}{3}\cdot\frac{3kd-2d_1}{2kd-d_1}\right\}$$

which in the notation of Table V. becomes :—

$$M_r = c_c\left(1-\frac{v}{2c}\right)b_1vh^2\left(1-\frac{3xv-2v^2}{6x-3v}\right)$$

(9).—*Standard Notation an Aid to Uniformity of Algebraical Expression.*—A striking demonstration of the help that would be afforded by the standardisation of nomenclature is to be found in Table VI., where fifteen formulæ for moments of resistance as stated by authorities mentioned in Tables I. to IV. are written with symbols taken from Table V. and reduced to identical algebraical form.

With the exception of Professor Talbot, all the writers adopt the straight-line theory, and their formulæ all mean the same thing, although the fact is hidden by differing symbols and methods of algebraical treatment.

In Column 1 the formulæ are given in their original form ; in Column 2 they are translated literally into the language of Table V. ; and in Column 3 the equations in Column 2 are reduced to their most simple terms.

Column 3 proves that if the various authors would adopt a standard code of notation, and consent, in some cases, to give up idiosyncrasies in the way of expression, there need be only one standard formula on the straight-line theory for the moment of resistance of reinforced concrete beams of rectangular section with single reinforcement.

The standard formula according to Table VI. would be

$$M_r = t_c\rho bh^2\left(1-\frac{x}{3}\right) = \tfrac{1}{2}c_c x b h^2\left(1-\frac{x}{3}\right)$$

Moreover, it is quite evident that all other equations necessary for practical use and for the demonstration of the same theory could also be expressed in uniform manner.

Three series of equations for the moments of resistance of rectangular beams with double reinforcement are selected, for the purpose of further comparison, from the formulæ of other authorities whose notation is given in Tables I. to IV.

Among these one of the most complete series is that of Messrs. Taylor & Thompson, for whom the formulæ were prepared by Professor Frank P. McKibben. They provide for the disposition of the reinforcement in compression either above, or below, or coincident with the centre of compression in the concrete, but the symbols used and the algebraical form adopted are such that only one formula is required for computation of the moments about the centre of compression in the three cases mentioned.

Another well-worked out series is that of Messrs. Marsh & Dunn, whose formulæ also provide for any desired position of the reinforcement in compression. For the purpose of the present comparison, we take only two of these formulæ, based on the condition that the centre of compression in the reinforcement is coincident with the centre of compression in the concrete, or, in other words, that $u = \frac{1}{2}x$ (see Table V.).

The third series is that of Mr. Sabin, who gives an equation for M_r with single reinforcement and an expression for the additional moments of resistance due to reinforcement in compression. This procedure is somewhat inconvenient, especially for purposes of comparison.

Taking moments about the centre of tension in the reinforcement, the equation of Messrs. Taylor & Thompson is

$$(1)\quad M_R = bd^2\left[\frac{Cx}{z}\left(1-\frac{x}{3}\right)+S^1p^1(1-a)\right]$$

Transposed by adopting the standard notation in Table V. and the algebraical form in Table VI., this becomes :—

$$(1a)\quad M_r = bh^2\left[\tfrac{1}{2}c_c x\left(1-\frac{x}{3}\right)+c_c\rho_c(1-u)\right]$$

or assuming that $u = \frac{1}{2}x$:—

$$(1a)\quad M_r = bh^2\left[\tfrac{1}{2}c_c x+c_c\rho_c\left(1-\frac{x}{3}\right)\right]$$

The corresponding equation of Messrs. Marsh & Dunn is

$$(2)\quad M = \left(\frac{cnb}{s}+nc'_c\right)\left(h-\frac{v}{3}\right)$$

which literally written in standard notation and algebraical form becomes :—

$$(2A)\quad M_r = (\tfrac{1}{2}c_c kxb + \rho_c bhc_s)\left(h - \frac{kx}{3}\right)$$

and by reduction

$$(2B)\quad M_r = bh^2\left[\tfrac{1}{2}c_c x + c_s\rho_c\left(1 - \frac{x}{3}\right)\right.$$

Even an expert mathematician could not detect by inspection any marked resemblance between equations (1) and (2); but, as shown by (1B) and (2B), these apparently dissimilar equations are essentially similar and when $u = \frac{1}{2}x$ the effect of standard notation is to bring them into exact agreement.

Taking moments about the centre of compression in the reinforcement, the equation of Messrs. Taylor & Thompson is :—

$$(3)\quad M_R = bd^2\left[Sp\,(1-a) - \frac{Cx}{2}\left(\frac{x}{3} - a\right)\right]$$

which, being written in standard notation, becomes

$$(3A)\quad M_r = bh^2\left[t_s\rho_t\,(1-u) - \tfrac{1}{2}c_c x\left(\frac{x}{3} - u\right)\right]$$

But when $u = \frac{1}{2}x$, the term $-\frac{1}{2}c_c x\left(\frac{x}{3} - u\right) = 0$, and the equation could be written

$$(3B)\quad M_r = bh^2\left[t_s\rho_t\left(1 - \frac{x}{3}\right)\right]$$

The corresponding equation of Messrs. Marsh & Dunn is

$$(4)\quad M = \frac{wuf_t}{3}\,(3h - u)$$

which in standard notation and algebraical form becomes

$$(4A)\quad M_r = \rho_t bh_s\left(h - \frac{kx}{3}\right)$$

and by reduction

$$(4B)\quad M_r = bh^2\left[t_s\rho_t\left(1 - \frac{x}{3}\right)\right]$$

Here again, when $u = \frac{1}{2}x$, the equations (3) and (4) are brought into exact agreement in the forms (3B) and (4B).

Taking moments about the centre of compression in the concrete, the equation of Messrs. Taylor & Thompson is :—

$$(5)\quad M_R = bd^2\left[Sp\left(1 - \frac{x}{3}\right) + S'p'\left(\frac{x}{3} - a\right)\right]$$

which being transposed becomes

$$(5A)\quad M_r = bh^2\left[t_s\rho_t\left(1 - \frac{x}{3}\right) + c_s\rho_c\left(\frac{x}{3} - u\right)\right]$$

In the case where $u = \frac{1}{2}x$, the equation could be written

$$(5B)\quad M_r = bh^2\left[t_s\rho_t\left(1 - \frac{x}{3}\right)\right]$$

Thus, under the assumed conditions the equation is the same as that for moments about the centre of compression in the reinforcement, and, of course, it agrees with the reduced form of Messrs. Marsh & Dunn's equation.

The only formula for the moment of resistance of a rectangular beam actually stated by Mr. Sabin is one about the centre of tension in the reinforcement or

$$M_o = zf_c\,\frac{y_1}{2}\left(\frac{2y_1}{3} + y_2\right)$$

but as this author states that the added moment of resistance for double reinforcement is $Az\,(x + y_2)\,fs$, Mr. Sabin's equation for double reinforcement would be :—

$$(6)\quad M_o = zf_c\,\frac{y_1}{2}\left(\frac{2y_1}{3} + y_2\right) + Az\,(x + y_2)\,f_s$$

which being literally transposed to standard notation becomes

$$(6A)\quad M_r = bc_c\frac{kx}{2}\left[\frac{2h-x}{3} + (h - kx)\right] + \rho_c bh\,[(kx - hu) + (h - kx)]\,c_s$$
$$= bh^2\left[\tfrac{1}{2}c_c x\left(1 - \frac{x}{3}\right) + c_s\rho_c\,(1-u)\right]$$

Assuming $u = \frac{1}{2}x$, this equation reduces to

$$(6B)\quad M_r = bh^2\left[\tfrac{1}{2}c_c x + c_c\rho_c\left(1 - \frac{x}{3}\right)\right]$$

which agrees exactly with (1B) and (2B) in spite of the different symbols and algebraical form adopted.

It is unnecessary to formulate equations for the moments of resistance about the centre of compression in the reinforcement and the centre of compression in the concrete, especially as expressions of the kind are not given by Mr. Sabin himself. But the example already taken shows that notwithstanding the inconvenient notation of this

TABLE V.—PROPOSED STANDARD NOTATION FOR REINFORCED CONCRETE BEAM FORMULÆ.

(All dimensions refer to rectangular beams except where otherwise stated.)

Linear Measurements and Ratios.	
[1]Breadth of rectangular beam, or rib in a T-beam	b
[1]Breadth of flange in T-beam	b_1
Length between supports	l
[1]Depth, total	d
[1]Depth to centre of tension in steel	h
[1]Depth below centre of tension in steel	d_1
[1]Depth to neutral axis	kx
[1]Depth from neutral axis to centre of tension in steel	$h\,(1-x)$
[1]Depth to centre of compression in concrete	$\frac{1}{3}kx$
[1]Depth to centre of compression in concrete (T-beam)	hu_c
[1]Depth from centre of compression in concrete to neutral axis	$\frac{2}{3}kx$
[1]Depth from centre of compression in concrete to neutral axis (T-beam)	$h\,(x - u_c)$
[1]Depth from centre of compression in concrete to centre of tension in steel	$h\left(1 - \frac{x}{3}\right)$
[1]Depth from centre of compression in concrete to centre of tension in steel (T-beam)	$h\,(1 - u_c)$
[1]Depth to centre of compression in steel	hu
[1]Depth to centre of compression in steel (T-beam)	hu_s
[1]Depth from centre of compression in steel to neutral axis	$h\,(x - u)$
[1]Depth from centre of compression in steel to neutral axis (T-beam)	$h\,(x - u_s)$
[1]Depth from centre of compression in steel to centre of tension in steel	$h\,(1 - u)$
[1]Depth from centre of compression in steel to centre of tension in steel (T-beam)	$h\,(1 - u_s)$
[1]Depth of flange in T-beam	$h_1 x$
[1]Depth from centre of compression in steel to centre of compression in concrete	$h\left(\frac{x}{3} - u\right)$
[1]Depth from centre of compression in steel to centre of compression in concrete (T-beam)	$h\,(u_c - u_s)$
Ratio of depth of neutral axis and centre of tension in steel	x
Ratio of depth of centres of compression and tension in steel	u
Ratio of depth of centres of compression and tension in steel (T-beam)	u_s
Ratio of depth of centre of compression in concrete in flange of T-beam and centre of tension in steel	u_c
Ratio of depth of flange and centre of tension (T-beam)	y
*Sectional Areas and Ratios.**	
Area, total	bd
Area above centre of tension in steel	bh
Area above neutral axis	bkx
Area of flange in T-beam	$b_1 h_1$
Area of steel in tension for or as for single reinforcement	ρbh
Area of steel in tension for or as for single reinforcement (T-beam)	$\rho b_1 h_1$
Area of extra steel in tension for double reinforcement	$\rho_c bh$
Area of extra steel in tension for double reinforcement (T-beam)	$\rho_c b_1 h_1$
Area of total steel in tension for double reinforcement	$\rho_t bh$
Area of total steel in tension for double reinforcement (T-beam)	$\rho_t b_1 h_1$
Area of steel in compression for double reinforcement	$\rho_c bh$
Area of steel in compression for double reinforcement (T-beam)	$\rho_c b_1 h_1$
Ratio of steel in tension for or as for single reinforcement	ρ
Ratio of extra steel in tension for double reinforcement	ρ_c
Ratio of total steel in tension for double reinforcement	ρ_t
Ratio of steel in compression for double reinforcement	ρ_c
Stresses and Strains.	
[2]Compressive stress intensity in concrete	c_c
[3]Compressive stress intensity in steel	c_s
[2]Tensile stress intensity in concrete	t_c
[2]Tensile stress intensity in steel	t_s
[2]Total compression in concrete	C_c
[3]Total compression in steel	C_s
[2]Total tension in concrete	T_c
[2]Total tension in steel	T_s
Elastic limit of steel	e
[3]Deformation of concrete	Δc
[3]Deformation of steel	Δs
Coefficients and Moments.	
Coefficient of elasticity of concrete in compression	E_c
Coefficient of elasticity of steel	E_s
Ratio of E for concrete in compression and E for steel	m
Bending moment	M_b
Moment of resistance	M_r

[1] See Fig. 4. [2] See Fig. 5. [3] See Fig. 6.

* In rectangular beams the ratio of steel ρ is taken in respect of the effective area bh, and in T-beams the ratio of steel ρ is taken in respect of the flange area $b_1 h_1$.

TABLE VI.—COMPARISON OF EQUATIONS FOR THE MOMENTS OF RESISTANCE OF REINFORCED CONCRETE BEAMS OF RECTANGULAR SECTION WITH SINGLE REINFORCEMENT.

Authors.	As written by Authors.	As literally transposed to Standard Notation.	As written in Standard Notation.
	Moments about the Centre of Compression in the Concrete.		
R.I.B.A.	$M = A_s f_s (d - \frac{1}{3}kd)$	$M_r = \rho bh t_s \left(h - \frac{kx}{3}\right)$	$M_r = t_s\rho bh^2\left(1 - \frac{x}{3}\right)$
Marsh & Dunn	$M = \frac{fw}{3}(3h - w)$	$M_r = t_s\rho bh\left(h - \frac{kx}{3}\right)$	$M_r = t_s\rho bh^2\left(1 - \frac{x}{3}\right)$
Twelvetrees	$M = f'_c a[\frac{2}{3}h_s + (h_y - z)]$	$M_r = t_s\rho bh\left(h - \frac{kx}{3}\right)$	$M_r = t_s\rho bh^2\left(1 - \frac{x}{3}\right)$
Johnson	$M_o = \frac{P_s}{3}(3y_2 + 2y_1)$	$M_r = \frac{T_s}{3}\left[3(h - kx) + 2kx\right]$	$M_r = t_s\rho bh^2\left(1 - \frac{x}{3}\right)$
Talbot	$M = Af(d - z)$	$M_r = \rho bht_s\left(h - \frac{kx}{3}\right)$	$M_r = t_s\rho bh^2\left(1 - \frac{x}{3}\right)$
Taylor & Thompson	$M_R = pSbd^2\left(1 - \frac{x}{3}\right)$	$M_r = \rho t_s bh\left(h - \frac{kx}{3}\right)$	$M_r = t_s\rho bh^2\left(1 - \frac{x}{3}\right)$
Turneaure	$M_s = f_s p j b d^2$	$M_r = t_s\rho\left(1 - \frac{x}{3}\right)bh^2$	$M_r = t_s\rho bh^2\left(1 - \frac{x}{3}\right)$
	Moments about the Centre of Tension in the Reinforcement.		
R.I.B.A.	$M = \frac{1}{2}A_c c_c\,(d - \frac{1}{3}kd)$	$M_r = \frac{1}{2}A_c c_c\left(h - \frac{kx}{3}\right)$	$M_r = \frac{1}{2}c_c xbh^2\left(1 - \frac{x}{3}\right)$
Marsh & Dunn	$M = \frac{cub}{2}\left(h - \frac{u}{3}\right)$	$M_r = \frac{c_c kxb}{2}\left(h - \frac{kx}{3}\right)$	$M_r = \frac{1}{2}c_c xbh^2\left(1 - \frac{x}{3}\right)$
Twelvetrees	$M = \frac{1}{2}f'_c bh_s[\frac{2}{3}h_s + (h_y - z)]$	$M_r = \frac{1}{2}c_c bhx\left(h - \frac{kx}{3}\right)$	$M_r = \frac{1}{2}c_c xbh^2\left(1 - \frac{x}{3}\right)$
Johnson	$M'_o = \frac{P_c}{3}(3y_2 + 2y_1)$	$M_r = \frac{C_c}{3}\left[3(h - kx) + 2kx\right]$	$M_r = \frac{1}{2}c_c xbh^2\left(1 - \frac{x}{3}\right)$
Sabin	$M_o = zf_c\frac{y_1}{2}\left(\frac{2y_1}{3} + y_2\right)$	$M_r = bc_c\frac{kx}{2}\left[\frac{2kx}{3} + h - kx\right]$	$M_r = \frac{1}{2}c_c xbh^2\left(1 - \frac{x}{3}\right)$
Talbot	$M = \left\{\frac{1 - \frac{1}{2}q}{1 - \frac{1}{3}q}\right\}\frac{1}{2}ckbd(d - z)$	$M_r = \left\{\frac{1 - \frac{1}{2}q}{1 - \frac{1}{3}q}\right\}\frac{1}{2}c_c xbh\left(h - \frac{kx}{3}\right)$	$M_r = \left\{\frac{1 - \frac{1}{2}q}{1 - \frac{1}{3}q}\right\}\frac{1}{2}c_c xbh^2\left(1 - \frac{x}{3}\right)$
Taylor & Thompson	$M_R = \frac{Cxbd^2}{2}\left(1 - \frac{x}{3}\right)$	$M_r = \frac{c_c xbh^2}{2}\left(1 - \frac{x}{3}\right)$	$M_r = \frac{1}{2}c_c xbh^2\left(1 - \frac{x}{3}\right)$
Turneaure	$M_c = \frac{1}{2}fcbjbd^2$	$M_r = \frac{1}{2}c_c x\left(h - \frac{kx}{3}\right)bh^2$	$M_r = \frac{1}{2}c_c xbh^2\left(1 - \frac{x}{3}\right)$

authority, the additional equations could be reduced to standard form without difficulty.

Similarly, it could be shown that formulæ for the value of the moments of resistance in T-beams with double reinforcement as stated by many different writers are quite capable of being written with standard symbols, and of being expressed in standard terms, so as to obviate the wasteful expenditure of time now entailed upon all who have occasion to read various books on the subject of reinforced concrete, or who desire to examine and to compare the formulæ of leading authorities.

General Building News.

THE NEW WALDORF HOTEL.—Another large hotel building has just been erected in the Strand district of London, and it is now ready for occupation. The new Waldorf Hotel is situated between the Waldorf and Aldwych theatres, and its main frontage can be seen to advantage at the Strand end of the crescent from which starts the new road leading to Holborn, and the building covers a site of nearly ¾ acre. It rather dwarfs the two theatres, but it is a well-designed structure, the architects for which are Messrs. A. Marshall Mackenzie & Son, the Waring-White Company being the builders. The front elevation, of sculptured Portland stone, resting on a basis of Aberdeenshire granite, is embellished with columns and groups of statuary representing the arts and sciences, and terminating in towers 120 ft. from the ground. The frieze of cupids was sculptured by Mr. Emil Fuchs. There are three public entrances to the hotel from Aldwych, that nearest to the Strand for guests staying in the hotel, the one nearest Kingsway for users of the grill-rooms, and the central for the use of those entering or leaving the restaurant. In connexion with each of the entrances there are cloakrooms. From the hall a staircase leads to the ladies' room, and close by is a billiard-room. The smoke-room opens out of the hall below, and overlooks the palm court. It is a panelled room with selected mahogany, and decorated with paintings after Pater, by Mr. H. A. Budd. From the hall and smoke-room entrance is gained to the palm court or lounge, which has marble floor, cream stone walls, and green trellis work. Opening on to the terrace that surrounds the court are the grand restaurant, the ball and banquet room, and the dining-hall for residents and their guests, the roof being supported by marble columns. On the floors above are the bedrooms and private suites. These constitute the great majority of the 420 rooms the hotel contains. There is one bathroom to every two bedrooms; electric lifts serve every floor. The kitchens have been so placed as to open directly into all the public dining-rooms. The hotel is of fireproof construction, and there are two fire hydrants on each floor. There are, besides the two main staircases, two iron fire-escapes leading from each floor. Approached through and overlooking the palm court is the restaurant of the hotel. The roof of the principle dining-room is supported by twelve marble columns. Adjoining this room is another, much the same size, to be used for private banquets, balls, and dances. The Masonic temple adjoins the grill-room, and occupies an area of 3,800 sq. ft.; it gives accommodation for 160 persons, and it contains a lounge. Cloakrooms and lavatories are provided on either side of the entrance-hall, and the grill-room itself is entered through a lounge. The design, furniture, and decoration of the public apartments are of the Louis Seize period. Messrs. Waring & Gillow supplied the furniture, etc., throughout the building.

NEW CHURCH, PARTICK, N.B.—Work has just been commenced in connexion with the erection of a new church for the Church of Scotland at the corner of Broomhill-drive, Partick. The building will be of red freestone, and is to be finished internally with red stone dressings. Accommodation is to be provided for over 800 worshippers. Halls are to be built later, a large hall to provide accommodation for 326, and a smaller one to accommodate 144. The total cost, including halls, is estimated at about 8,000*l*. The architects are Messrs. Stewart & Paterson, of Glasgow.

CHURCH ENLARGEMENT, DRAYTON.—A new north aisle and vestry have been added to the parish church of Drayton. The scheme as originally drawn contemplated also the building of a chancel aisle, but that has still to be achieved. The estimated expenditure was about 1,500*l*. The architects of the work were Messrs. Lacey & Upcher, of Norwich, and the general contractors have been Messrs. G. E. Hawes & Sons. The glazing was executed by Mr. T. Horth; the wrought-iron hinges were made by Mr. R. Spalding, all of Norwich; and thatch has been put on by Messrs. Farman Brothers, of Salhouse.

CONGREGATIONAL CHURCH, NEWPORT, MON.—Emmanuel Congregational Church, Maindee, Newport, has just been opened. The new church will accommodate 650 worshippers, and was designed by Messrs. Habershon, Fawckner, & Co., architects, Newport and Cardiff.

CHURCH ENLARGEMENT, EXBURY.—Improvements and additions have been made to Exbury Church, in the New Forest. The alterations were the design of Messrs. John Aldridge Scott & Son, and the work was carried out by Messrs. Musselwhite & Sapp, of Basingstoke.

PROPOSED CHURCH IMPROVEMENTS, BOLTON.—It is proposed to carry out extensive alterations at St. George's, Bolton, and Messrs. Bradshaw & Gass, with whom is associated Mr. A. J. Hope, have submitted a report on the subject to the vicar.

COUNCIL SCHOOLS, POULTON, WALLASEY.—New schools have been erected at Poulton by the Wallasey District Council. The premises are in two blocks:—(1) For senior and junior mixed; (2) for infants. The junior mixed school is on the ground floor, and consists of a lateral assembly hall and six classrooms to accommodate 330 pupils. The senior mixed school, on the first floor, is a duplicate of the ground floor school, and will accommodate the same number of pupils. The infants' school has a lateral hall and six classrooms, and is built for 340 children. Separate entrances with cloakrooms, lavatories, etc., are provided for each department, together with the necessary storerooms and rooms for the teachers, and a caretaker's house has been included in the scheme. The buildings are lighted throughout by electric light, and heated on the low-pressure hot-water system, supplemented when necessary by open fires. The materials are common hand-made bricks with red terra-cotta dressings. Mr. J. Holt, architect, Manchester, prepared the plans.

PROPOSED ART SCHOOL AND GIRLS' SCHOOL, CAMBRIDGE.—The Cambridge County Education Committee have approved and adopted plans, prepared by the County Architect (Mr. H. H. Dunn), for a girls' school and school of arts and crafts attached, and the Buildings and General Purposes Sub-Committee have been instructed to obtain tenders as soon as the sanction of the County Council has been obtained.

COUNCIL SCHOOL, ILFORD.—The South Park School, erected by the Ilford Education Committee, has just been opened. The building is intended solely for an infants' and junior mixed school, and is to accommodate 330 infants on the ground flood and 300 junior mixed on the first floor. Each floor consists of six classrooms and central hall, with cloakrooms, lavatories, entrance corridors, and staircases at each end. Teachers' private rooms are formed in the mezzanine floor at each end. In the basement are provided coal and other stores, hot-water heating apparatus, and a lift for conveying coal, etc., to each floor above. The building is of fire-resisting construction throughout, the floors of classrooms and central halls being of steel joists and concrete, paved with pitch-pine blocks; the corridors, cloakrooms, lavatories, and stores being of reinforced concrete, paved with granolithic; and the staircases being reinforced concrete, with York stone treads. Mr. C. J. Dawson, architect, of Ilford, prepared the plans.

HOSPITAL, GREENOCK.—The new combination hospital erected at Gateside, Inverkip-road, Greenock, to serve the three burghs of Greenock, Port Glasgow, and Gourock, and the western portion of Renfrewshire, has just been opened. There are twelve different blocks of buildings, each intended to serve a specific purpose. At present the hospital provides accommodation for 118 adult beds, which can be considerably increased in the case of children. Provision is made for a further extension of the scarlet fever wards to the extent of forty-four beds, so that the completed hospital will be able to accommodate 162 adult cases. The buildings are of brick and rough-cast on face, and the floors of the two-story blocks are fireproof. In the wards, which are airy and well lighted, a novel feature is the introduction of circular instead of square ends. The heating is on the Reck system, and the buildings are lighted with electricity. The total cost of the hospital will be about 400*l*. per bed, and the architect of the work is Mr. Alexander Cullen, Mr. John Dixon being the consulting engineer.

PROPOSED NEW MUSIC-HALL, NOTTINGHAM.—The Nottingham Watch Committee have approved the plans for a new hippodrome that a music-hall syndicate proposes to erect on the site at the junction of Goldsmith-street and Wollaton-street. The stipulated seating accommodation of the new hall, which will cost, apart from the land, 40,000*l*., is 2,500, and its holding capacity 3,200. Mr. Bertie Crewe is the architect.

PROPOSED ADDITIONS TO THE COURTHOUSE, SHEFFIELD.—It is proposed to carry out extensive additions to the Sheffield Courthouse. A special committee representing the City Justices and the Watch Committee has been appointed, and they will consider the whole subject of court and office accommodation.

CLUB PREMISES, REDDITCH.—New premises have been built for the Unionist Club at Redditch. The building comprises a bar and smoke-room combined, reading-room, billiard-room, lavatory and bath-rooms, and quarters for the caretakers. The principal assembly-room is 47 ft. 4 in. by 27 ft. 9 in., and there are two retiring-rooms. Mr. J. Johnson was the architect of the work, the cost of which was about 3,000*l*.

ADDITIONS TO NAPSBURY ASYLUM.—At the last meeting of Middlesex County Council it was reported that sketch plans for providing accommodation for 582 additional patients at Napsbury Asylum had been prepared by Mr. Rowland Plumbe (the architect of the main building). The cost of the extension will be as follows:—Additional blocks and alteration of villas, 81,174*l*. (139*l*. per head for the 582 patients); alterations and additions to, and drainage of, roads, the laying out and fencing of airing courts, remodelling and extension of the septic tanks, contact beds, and sewage treatment works, additional cooking apparatus and additional machinery in the laundry, 5,150*l*.; office and stores for the engineer, 489*l*.; architect's commission, 3,472*l*. 10s. 4d.; quantity surveyor's charges, 868*l*. 2s. 8d.; clerk of the works, 315*l*.; total, 91,469*l*. 13s. In addition the equipment of the building is estimated to cost 15,000*l*., so that the total cost for 582 beds will work out at a little less than 138*l*. per bed. The sketch plans are to be submitted to the Lunacy Commissioners.

EXTENSION OF THE ACADEMY, PERTH.—The Perth School Board have acquired two houses in Atholl-street for the accommodation of the preparatory and junior classes of the Academy. Messrs. Smart & Stewart, architects, have submitted to the Board on the condition of the premises, and suggesting necessary alterations, the total cost of which they estimate at 1,950*l*.

PROPOSED SANATORIUM, STREAMHILL, CO. CORK.—An inquiry was recently held by Mr. P. C. Cowan, M.Inst.C.E., Chief Engineering Inspector to the Local Government Board, with Dr. Coey Biggar, medical inspector, into an application of the Cork Joint Hospital Board for sanction to raise a loan for the purpose of erecting a sanatorium. The sum applied for was 12,000*l*., and it is proposed to establish the new institution at Streamhill, in Co. Cork.

PROPOSED NEW BANK PREMISES, MANCHESTER.—It is proposed to erect new premises at the corner of Brown-street and Norfolk-street, Manchester, for the Palatine Bank. Messrs. Briggs, Wolstenholme, & Thornely, of Liverpool and Blackburn, are the architects.

MANSE, SEAHOUSES.—A new manse is being built for the minister of the North Sunderland circuit, Primitive Methodist Connexion, at Seahouses. The work is being carried out in freestone from Lonnen Head quarry, in coursed rock-faced blockers. Messrs. E. Fordy & Son are executing the mason work from plans by Mr. George Reavell, architect, Alnwick and Morpeth.

SAILORS' INSTITUTE, PENZANCE.—A New Sailors' Institute and Mission-hall, designed by Mr. Oliver Caldwell, has been built in this town. The exterior of the structure is of Castle-an-Dinas stone, with red brick facings, and the interior embraces a hall, secretary's office, oak-furnished room for games, reading-room and library, etc., and a mission-hall.

TRADE NEWS.

MESSRS. D. G. SOMERVILLE & CO. have been successful in securing the contract for the whole of the reinforced concrete sound and fire resisting floors, along with all the reinforced clothing to the structural steelwork, for the new premises being erected for the Norwich Insurance Company at the corner of Piccadilly and St. James's-street (Messrs. Runtz & Ford, architects). They have also secured the contract for the construction and supply of the steel roofing at Messrs. Ediswans' extension at Ponders End; at Messrs. Carwardine's new flour mills in Kingsland-road; and the reinforced concrete domes and roofs to St. Charles' College Chapel, Notting Hill (Messrs. Lamb & North, architects).——Messrs. Merryweather have erected, at the new Dykebar Asylum, a stationary fire-engine of the double-cylinder, vertical "Greenwich Gem" pattern, specially designed by the makers to give high efficiency for fire and general pumping work, where a powerful but light-weight engine occupying small floor space is required. The engine, which has a pumping capacity of 700 gallons per minute, is arranged to work from the asylum boiler at a pressure of 100 lb. to 120 lb. per square inch, and is connected to a system of fire-main piping running through

the building, with hydrants at various points, so that in the event of a fire breaking out powerful high-pressure jets can be brought into play at any point where required.——In the recent additions at the General Hospital, Bristol, comprising a new block for nurses' compartments, carried out by Messrs. Humphries & Son, builders, under Messrs. Oatley & Lawrence, architects, the whole has been erected in St. Aldhelm box-ground stone supplied by the Bath Stone Firms, Ltd. Mr. J. Storrs Fry, the President of the hospital, has presented a fountain, which is erected in the courtyard, of Portland stone prepared by the same firm at their works at Portland.——The "Dennis" Ruabon Terra-cotta, manufactured by the Ruabon Coal and Coke Company, has been employed on the following recent buildings in London:—The Leysian Mission, City-road (red terra-cotta); Messrs. Sanderson & Sons' new premises, Berners-street (pink terra-cotta and red facing bricks); Wellington House, Buckingham Gate, S.W. (buff); Marble Arch Hotel, over the Tube station (buff).——A large clock has been erected in the church tower of Brancaster Church, Norfolk, which shows time on two dials each 5 ft. across, and strikes the hours on a large bell. It is fitted with all the latest improvements, and made to the designs of the late Lord Grimthorpe by Messrs. John Smith & Sons, Midland Clock Works, Derby, who guarantee it to maintain perfectly accurate time. The same firm a few years ago erected the clock in the neighbouring church of Docking.——The Briqueterie et Tuilerie Mécaniques, of Zandvoorde, near Ostend, who have been supplying the bricks for the new Benedictine Abbey at Quarr, near Ryde, have recently secured an order for 12,000,000 of their bricks; this, with other orders in hand, such as churches at Brussels, Arlon, and Zeebrugge, and a convent at Assebroucke, near Bruges, and 1,200,000 bricks for the new railway from Bruges to Zeebrugge, brings up their present demands to 16,142,000. The bricks are beautifully finished, and of pleasing colours; they are a trifle smaller than ours, though the firm makes to order to English sizes during the summer months. The bricks are not so expensive as English ones.

Sanitary and Engineering News.

NATIONAL REGISTRATION OF PLUMBERS.—Messrs. John Knight, R.P. (Master), and W. J. Jarvis, R.P. (Operative), have been elected by ballot as representatives of the registered plumbers of the London District on the Registration Committee for two years ending December 31, 1909. The plumbers' associations and public bodies represented on the Committee have made the following nominations:—Messrs. C. Thomerson, R.P., and W. Fayers, R.P., representing the London Society of Associated Master Plumbers; Messrs. F. Herbert, R.P., and W. J. Sturgess, R.P., representing the London Management Committee of the United Operative Plumbers' Association of Great Britain and Ireland; Mr. F. Wyatt, R.P., representing the Executive Council of the United Operative Plumbers' Association of Great Britain and Ireland; Mr. W. Smeaton, R.P., representing the London Plumbers' Society; Dr. Reginald Dudfield, representing the Incorporated Society of Medical Officers of Health; Mr. T. W. A. Hayward, A.M.Inst.C.E., representing the Incorporated Association of Municipal and County Engineers; and Mr. H. D. Searles-Wood, F.R.I.B.A., representing the Royal Institute of British Architects.

Foreign.

GERMANY.—A premium of 1,500 marks was won by Messrs. Klein & Wolff, of Breslau, in the competition for designs for the Lauterbach Buildings to be erected in the Kaiser Wilhelm Strasse, Breslau. Herr A. Ruckreim, of Charlottenburg, was also awarded a premium of like value.

AUSTRIA.—Herr Hans Nowack's premiated scheme has been put in hand for the embellishment of the Makart Platz, Salzburg. The square is to be laid out as a pleasure-ground, decorated with architectural *motifs*. Since Fischer von Erlach's Trinity Church has also recently been freed of surrounding buildings, the Makart Platz should, on the completion of the works, rank among the finest in Salzburg.

RUSSIA.—Next year, being the 200th anniversary of the battle of Poltava, which may be regarded as the beginning of modern Russian history, a great new public building, to be used as an historical museum, will be begun in St. Petersburg, near the Duma and the Suworroff Museum. The work will last from three and a half to four years, and it is expected that the formal opening of the building will take place on December 25, 1912, the year in which will be commemorated the war with Napoleon I. The new museum will be an important addition to the somewhat scanty architectural beauties of the Russian capital, which contains few buildings of importance save the Winter Palace and St. Isaac's.——Russian railway companies are contemplating building several important lines in the near future. Amongst others (1) an electric railway, 64 kilometres long, from St. Petersburg to Krassnaja Gorka, on the Gulf of Finland. (2) The Altai Railway, from the Siberian Halt Moschkowo to the Gurjewer mine, the oldest smelting works in Altai (founded 1726); the line would be 307 kilometres long, and cost 43·2 million marks, or 140,000 marks per kilometre. It would supply the Siberian railways with coal. (3) The Namangan-Kokand line, 90 kilometres long, which would cost 13,062 million marks to build, and would chiefly transport raw cotton, which is the most important product of that district in Russian Turkestan. (4) The Tavda line, 222 kilometres, which would connect Perm with the coalfields and forests round Tabarinskaja and so supply the northern and middle Urals with fuel, and offer facilities to settlers in the Tavda valley. (5) The Polar-Ural line would revive commerce between Siberia and Europe on the north coast, cheapen the transport of Siberian raw material, especially of wheat, and replace steam navigation on the Kara Sea and the Gulf of Obi, so feared by seamen. The line would traverse the Urals from Obdorsk, the most northern village in the Obi district inhabited by Russians, to a spot 400 kilometres west on the north coast. Other proposed works are the Moscow-Revel line, 900 kilometres long, estimated at 29·26 million marks; and the Amoor line, which runs 1,450 kilometres west into the Shilka Valley, and is in course of construction by the Government.

SWITZERLAND.—In the XVIIIth century the monks of St. Bernard started records of meteorological observations, but these were, unfortunately, lost. It is only since 1817, when Professor Pictet, of Geneva, equipped the new observatory, that a continuous record has been kept, which is all the more valuable that the hospice is the oldest upland observatory which is in direct communication with a low-lying station, *i.e.*, Geneva. In order to verify the levels, last ascertained in 1855, recent observations were made which show the difference in level of the barometer between the two stations to be 2070·86, as against 2070·34. The new survey also showed a small discrepancy of 46 centimetres in the difference of level between Martigny and the hospital, a matter of 2,003 metres. Thanks to all the scientific precautions taken while establishing these levels, the mean error per kilometre worked out at under 1 millimetre, *i.e.*, the same accuracy was observed as is possible when surveying on level ground.

JAPANESE EXHIBITION, 1912.—A site of 290 acres is taken for the Grand Exhibition which will be held in Tokio in April-October, 1912. Space in the general buildings will be assigned to foreign exhibitors in the sections of science, machinery, electricity, manufactures, and education, whilst for exhibits outside those five sections separate buildings may be erected at the exhibitors' own charges, and without payment for the use of the sites. No customs' duties will be levied upon materials for the buildings erected by foreign Governments, or for special exhibition buildings and their decorations, or upon foreign articles imported solely for purposes of the exhibition.

Miscellaneous.

PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.—The Ruabon Coal and Coke Company have removed their London offices from 17, Wharf, Paddington, to 14, Craven-road, Paddington.——The Columbian Fireproofing Company, Ltd., of 37, King William-street, London, E.C., have appointed Mr. F. W. Nicholson as their new manager.

THE ROYAL ACADEMY.—The dates for sending in works for this year's exhibition are fixed as follows:—Water-colours, Miniatures, Black and White Drawings, Engravings, Etchings, Architectural Drawings, and all other works under glass—Friday, March 27. Oil Paintings—Saturday, March 28, and Monday, March 30. Sculpture—Tuesday, March 31. The hours of reception are from 7 a.m. to 10 p.m. on each of the days named.

THE GARDEN CLUB, FRANCO-BRITISH EXHIBITION.—For the Garden Club, now being formed in connexion with the Franco-British Exhibition, a club-house is being constructed with a frontage of 300 ft., and a depth of over 130 ft. The façade of the dining-hall is composed entirely of large glazed panels, and its doors and windows open directly upon gardens, in the centre of which is an ornamental sunken band stand. There is likewise a banqueting-hall, nearly 100 ft. long, and a somewhat smaller room in which private dinner parties may be given by members, while on the lower floor and on the terrace above are numerous partly-closed spaces suitable for small dinners and luncheons, in addition to a score of private dining-rooms.

HONOURS TO ARCHITECTS.—At the recent meeting at the Mansion House, the Lord Mayor in the chair, for distribution by the Italian Ambassador of the awards of the Milan International Exhibition of 1906, the following architects were among the recipients of honours:—Mr. C. Harrison Townend, F.R.I.B.A. (juror)—Diploma di Benemerenza; Mr. Edwin T. Hall, F.R.I.B.A.—two gold medals; Mr. H. Percy Adams, F.R.I.B.A.—gold medal.

CORRECTION.—In our issue for January 25, in our report of the proceedings of the London County Council, we stated that it was agreed to lend Battersea Borough Council 10,000*l.* for paving, etc., works. We are informed that this is incorrect, and that the application of the Borough Council was refused. This appears to be so, but our representative was informed that the loan had been granted.

SLATE TRADE.—The past year has been a very poor one for the slate trade, though slightly better than 1906 as the great slump in prices occurred that year. The depressed state of the building trade, combined with the competition of roofing tiles and foreign slates, kept down prices, but prospects for the current year are better, as the building trade is improving in some districts, the make of slates (especially at the Festiniog quarries) is less, and foreign imports are declining. Quarry owners will be compelled by the present low prices to lessen their cost of production by adopting improved machinery and "scrapping" many of their old steam-engines, etc. The quarries now showing profits have not only rock of the highest quality, but also the best methods of working, together with electric or other cheap power and low wages. The increased German duty checks trade with that country, but it is believed that the preference in Australia will assist trade in that quarter.

QUEENSLAND TIMBER MERCHANTS.—We are informed that the following merchants in the colony are prepared to undertake the export of the pine and hardwood timbers of Queensland:—The Associated Timber Merchants' Society, Brisbane; Messrs. Brown & Broad, Ltd., Brisbane; Messrs. James Campbell & Sons, Ltd., Brisbane; The Queensland National Products Company, Brisbane; and Messrs. Rooney & Co., Townsville.

SIAMESE TEAK.—In the course of a paper before the Society of Arts on Thursday evening last week on "Siam" Mr. H. Hillman said that unfortunately the forests had been overworked in the past, and the supply of Siamese teak was likely to fall off for a few years at least. The last two seasons had been very good floating ones, and a lot of accumulations in the creeks were floated out, so that there was now no reserve to look forward to to keep up the average, and, with a reduction in the number of trees available, there was sure to be a falling off in supplies. The Government had taken a wise step in getting the loan of several of the Burmese Forest Department officials, and with regulations for the planting of young trees for every tree cut down, and the prohibiting of the felling of trees below a given girth, they might look forward eventually to a restocking of forests now worked out.

LAMBETH BOROUGH COUNCIL.—At the sitting of the Lambeth Borough Council on Thursday last week it was reported that the London County Council had given their approval to the building of an underground convenience at Waterloo over the Council's sewer.—The tender of Messrs. Maples & Co. of 1,028*l.* 15*s.* was accepted for making and fixing counters, shelving, and other joinery works at the new Town Hall.—For the purpose of finding work for the unemployed, sanction was given to the clearing of the site of the Rommany-road depôt.

COMBINED DRAINAGE.—The conference of representatives of the City and Metropolitan Borough Councils, which last year considered the subject of the unsatisfactory state of the law relating to combined drainage, has drafted a Bill which is being submitted to the various borough councils with the idea of its being submitted to Parliament. The draft Bill enacts that the word "drain" (for the purposes of the Metropolis Management Acts, 1855 to 1899, and the Public Health (London) Act, 1891, or amending Acts) shall be deemed to include any sewer or drain, whether constructed before or after the passing of the Bill, with which two or more houses or premises are at the date of the passing of the Bill or may at any time

thereafter be connected, or which is used or capable of being or intended to be used for the conveyance of the drainage of such houses or buildings directly or indirectly to any sewer which has been approved as such by the Metropolitan Commissioners of Sewers, the Metropolitan Board of Works, or the London County Council, but shall not include any sewer so approved as aforesaid.

COLLAPSING LAMBETH LIBRARY.—At the meeting of the Lambeth Borough Council on Thursday last week it was decided to invite quotations from contractors for the execution of underpinning, rebuilding, and other works at the North Lambeth Library. A report of the Libraries Committee explained that in consequence of subsidences caused by the excavations for the Baker-street and Waterloo Railway certain reparation and rebuilding works were necessary at the library. The railway company had paid the Council 500*l.* in full discharge of any claim which the Council might have upon the company in respect of such subsidences. The Committee asked Mr. Wakefield, the architect for the Herne Hill Library, to inspect the building and advise what was necessary to be done. Having received the architect's report, the Committee concluded that the following works would have to be carried out:—Underpinning of part of the western wall of the lending library; rebuilding of the western wall of the reading-room, bringing such wall out to the extent of the library site; underpinning of part of the eastern corridor wall, and making good all other cracks, constructing window over staircase, and repairing top light in the reading-room near the Peartree-street entrance. As the works are of a more or less special nature, the Council agreed to the suggestion of the Committee that six firms of good standing should be selected to tender, instead of putting the work out to public competition.

PRESENTATION TO A SURVEYOR.—The members of the Amble Urban District Council recently made a presentation to Mr. Wm. Gibson, their surveyor, in recognition of his long service.

ANTIQUARIAN DISCOVERIES IN LINCOLNSHIRE.—Several interesting dicoveries, says the *Yorkshire Post*, have been made in the course of the restoration of the Church of St. Margaret, Marton, Lincolnshire. The church itself is 900 years old, and the tower and nave are built in XIth century herring-bone architecture. Among the various objects unearthed are a very ancient pewter chalice and an undamaged patin, which were found in a tomb, probably that of a priest, near the north wall. The head-stone of a stone coffin, built into one of the walls, and a stone crucifix carved on an indented cross have also been discovered.

DISPUTE BETWEEN IPSWICH GUARDIANS AND CONTRACTORS.—At a recent meeting of the Ipswich Board of Guardians a letter was read from Messrs. Fisk & Co., contractors, with reference to a tender of theirs which had been accepted by the Guardians. After expressing regret at their inability to sign the proved contract, Messrs. Fisk & Co. stated that:—"When we sent you our tender, we did so quite prepared to carry out the work to your entire satisfaction in accordance with your specifications, and, as we would undoubtedly suppose, under a contract issued by the Royal Institute of British Architects, but we are not prepared to sign a contract with so many arbitrary clauses. The penalties and conditions in the latter half of clause 5—for the painting of windows and doors—are out of all reason, and you ask us to produce our books at any time called upon for inspection by members of the Board of Guardians, who are interested in the same trade as ourselves. This we most decidedly decline to do. In any case, as we have been informed by one of our workmen that he heard the whole matter discussed by a member of the Board of Guardians in a public-house before a number of people, we must decline to have anything to do with business carried on in this way." In the course of the discussion which followed, the Chairman remarked that the question was whether the terms of the contract were not too stringent. He believed that Mr. Fisk had submitted the contract to several fellow-builders in the town, and they had advised him not to sign it, as the conditions were much more onerous than was usual. The Clerk stated that with reference to the inspection of the books, the contract was certainly stringent, but if Mr. Fisk had come to him before he addressed a letter to the Board, it was quite likely a modification could have been arranged. After further discussion, it was decided to refer the letter back to the Machinery and Works Committee, to confer with Mr. Fisk, and see if some terms could be arranged, the Committee to report to the Board.

BUST OF THE LATE ALDERMAN BENTLEY.—A bust has been executed by Mr. F. W. Doyle Jones, of Chelsea, of the late Alderman William Bentley, who was Lord Mayor of York in 1906.

THE NEW CITY HALL AT HULL.—At a recent meeting of the Hull Corporation Property Committee, the City Architect reported that another difficulty had arisen during the excavations on the site for the City Hall. He stated that the subsoil was composed of silt and sand, and that apparently there had been previous excavations which had been refilled with loose soil and sand. The proposed shops and art gallery could not be erected on the existing subsoil, and he, therefore, suggested piling and concreting. There was no reason to anticipate this discovery, as the other half of the site had a subsoil of strong clay. At the time Mr. Panton signed the contract there was no question of piling, and as he did not seem inclined to accept it, the committee would have to make some other arrangements. The matter was left in the hands of the Chairman, Deputy-Chairman, and City Architect.

HOUSE ACCOMMODATION IN GLASGOW.—Mr. William Fraser, F.S.I., recently read a paper before the Royal Philosophical Society of Glasgow on "Fluctuations of the Building Trade: Production and Market of House Accommodation." Mr. Fraser said a series of tables he had prepared regarding the building, owning, and occupying of Glasgow houses showed a gradual but slight improvement in the standard of house accommodation and occupation since 1871. A still more satisfactory feature of progress was that the average number of occupants per house was gradually decreasing. One was forced to the conclusion that a mere provision of additional houses would not reduce the overcrowding. Statistics of the letting of Glasgow showed that the small houses were at present the worst let, 8·5 per cent. of those under 10*l.* being empty, as against 7·9 per cent. of the whole. The property held by the Corporation, particularly business premises, was worse let than the average of the city, and the present experience should act as a deterrent against further municipal building schemes. The property market was naturally suffering on account of the large proportion of "empties." The decrease in volume of public sales of tenement property from 530,685*l.* in 1896 to 84,085*l.* last year was more remarkable than the shrinkage in price, which was partly due to a poorer class of property forming the bulk of the subjects sold. A table giving the extent of house building in Glasgow for thirty-five years showed that fully 90,000 houses had been erected during that period at a cost of nearly 20 millions sterling. With the increasing number of "empties" the number of houses built had fallen from 4,837 in 1902-3 to 1,442 in 1906-7. In 1871 the average rent of all the Glasgow houses was a little over 10*l.*, while it was now more than 14*l.*, but the average house had increased in size and improved in equipment.

FULHAM CENTRAL LIBRARY.—In connexion with the erection of the proposed new Central Library at Fulham, the gift of Dr. Carnegie, the Libraries Committee report having had before them the names of a number of architects who have more or less made a speciality of library construction. As a result they invited Mr. H. T. Hare to attend their last meeting and interviewed him. The Committee was unanimously in favour of appointing him as architect.

APPOINTMENT OF SANITARY OFFICERS.—The Local Government Board has sanctioned the appointment of Dr. Charles Porter as medical officer of health of the Metropolitan Borough of Finsbury in the place of Dr. G. Newman, resigned. The Board has also sanctioned the appointment of Mr. R. H. Waterman, as sanitary inspector, in the Metropolitan Borough of Stepney.

DEPTFORD BOROUGH COUNCIL.—At the sitting of the Council on Tuesday, it was reported that the Chief Engineer of the London County Council had forwarded a preliminary plan showing the dimensions and levels, etc., relating to the reconstruction of Necker Bridge. The details showed generally that the new bridge will be 40 ft. wide, with a carriage-way of 24 ft., and footways on either side 8 ft. wide. The footways will be paved with 3-in. York stone finished with 12-in. by 8-in. granite kerb. The carriage-ways of the approaches are to be paved with 7-in. granite setts, and the carriage-way of the bridge itself with 6-in. granite setts, and a 12-in. by 7-in. granite channel throughout. It was agreed to make several suggestions to the London County Council, including the provision of new gullies where required in the approaches, and the provision of a 12-in. by 7-in. granite channel stone to be laid in the carriage-way on the up side of each approach at a sufficient distance from the channel to form a track for the offside wheels of vehicles.——With reference to the paving works at the Mortuary, for which the tender of the Patent Impervious Stone Company, at 127*l.* 5*s.*, was accepted, it was reported that the company had declined to execute the work unless an extra allowance was made for covering up the paving during frost. It was agreed that the tender of the Improved Wood Pavement Company, of 128*l.* 19*s.* 9*d.*, be accepted.

BUILDINGS FOR SMALL HOLDINGS IN SCOTLAND.—With the view of encouraging estate architects and others to give increased attention to the designing of buildings specially adapted for small holdings, the Highland and Agricultural Society last year voted a sum of 200*l.* for the organising and carrying out of a competitive exhibition of plans for these buildings. Prizes were offered for plans for two classes of holdings:—(1) For holdings not over 20 acres in extent; and (2) for a "one pair of horse farm." In the first section the architect had to aim at keeping the total cost under 350*l.*, and in section 2 the cost was not to exceed 550*l.* The prizes were awarded by a committee, guided professionally by Mr. James Maitland, architect, Tain, Ross-shire. The following are the awards for the plans:—Section I: Plans suitable for holdings not exceeding 20 acres in extent (twenty-one entries)—First prize, 5*l.*, and silver medal; second, 2*l.* and bronze medal; third, bronze medal—1, John Duff, Stair Estate Office, Stranraer, and William Inglis, 2, Craighall-crescent, Trinity, Edinburgh (equal); 3, Thomas Strachan, Keir Estates, Dunblane; highly commended, F. D. Cowieson & Co., 3, Charles-street, St. Rollox, Glasgow; Robert Douglas, architect, 72, High-street, Lockerbie; Evan Tweedie, 43, Lady-street, Annan; commended, Wm. L. Duncan, Hallhill, Turiff; Lennox & MacMath, 103, Bath-street, Glasgow; W. S. Makins & Son, 79, West Regent-street, Glasgow. Section II: Plans suitable for a one pair of horse farm (seventeen entries)—First prize, 6*l.* and silver medal; second, 3*l.* and bronze medal; third, bronze medal—1, William Inglis, 2, Craighall-crescent, Trinity, Edinburgh; 2, Leslie Dawson, Estate Office, Haddo House, Aberdeen; 3, Alexander Reith, Earnock Estate Office, Hillhouse, Hamilton; highly commended, John Duff, Stair Estate Office, Stranraer; Donald Ferguson, Quarry-lane, Lennoxtown; commended, Will. B. Ballantyne, Kerse Estate Office, Falkirk; Andrew Graham, Raith, Kirkcaldy; Lennox & MacMath, 103, Bath-street, Glasgow.

NEW WORKS AT WOLVERHAMPTON.—Messrs. Chubb & Sons have decided to establish safe manufacturing works at Wolverhampton, where their lock works are already situated.

METROPOLITAN PUBLIC GARDENS ASSOCIATION.—The report for 1907 sets forth that sums are still required for completing the acquisition by purchase of open spaces at Grove Hall, Bow (800*l.*), Gipsy-road, Norwood (2,100*l.*), and Barking-road, East Ham (1,750*l.*), and that the Association have been instrumental in preventing the erection of buildings upon Hampstead Heath and Eltham Common, in the laying-out of grounds in Clapton, Islington, and the City of London, and in the planting and preservation of trees in East Ham, Walthamstow, and elsewhere. A representative of the Association will attend a conference upon "Espaces Libres," to be held on January 28 in Paris by the Musée Social, under the Presidency of M. Jules Siegfried. The financial statement shows an income of 3,660*l.*, but that sum includes one or two large and exceptional donations.

Legal.

THE SOUTHWARK PARTY-WALL DISPUTE.

THE case of Walsh *v.* the Mayor, etc., of Southwark (Higgs & Co. third parties) came before Mr. Justice Sutton in the King's Bench Division on the 22nd ult. on further consideration, the action having been tried before ago. (Reported in the *Builder* of January 18 last).

In this case the plaintiff, Mr. Thomas Walsh, a bootmaker, claimed damages against the defendants for alleged nuisance and trespass, his case being that the defendants, in building operations, had committed various trespasses upon his premises, and had, in regard to a party wall, contravened the provisions of the London Building Act. At the trial the jury returned a verdict in favour of the plaintiff, and the case now came on for argument as to which way judgment should be entered on the verdict.

At the conclusion of lengthy legal arguments on behalf of the parties, his Lordship directed that judgment should be entered for the plaintiff against the defendants for 51*l.* 10*s.* and costs, but directed that no costs should be allowed the plaintiff in respect of the claim made in paragraph 4 of the statement of claim. He also directed that there should be judgment for the third parties, Messrs. Higgs & Co., with costs against the defendants.

DAMAGE TO PROPERTY BY SUBSIDENCE.

In the Court of Appeal, consisting of the Master of the Rolls and Lords Justices Moulton and Farwell, on the 23rd ult. a considered judgment was delivered in the case of Mary Forster and others *v.* the Elvert Colliery Company and others, on the appeal of the defendants, A. B. Dyson, F. E. Crawford, and T. C. Crawford, from a judgment of Mr. Justice Ridley sitting without a jury at the Durham Assizes. (The case was reported in the *Builder* of December 21, 1907.)

In this case the appellants were sued as the trustees of the will of the late Mr. Thomas Crawford for damages for the subsidence caused through the alleged working of coal beneath the surface owned by the several plaintiffs. The colliery company, having submitted to judgment, had no concern in the present appeal.

It appeared that the surface upon and the minerals beneath the area in question originally belonged to the Dean and Chapter of Durham, and afterwards became vested in the Ecclesiastical Commissioners. A lease of the minerals was granted in 1887 by the Commissioners to Mr. Thomas Crawford, and he worked the coal down to the date of his death in September, 1887. By his will Mr. Crawford devised all his rights under the lease to his trustees in trust for his daughter, and the trustees worked the colliery down to 1896, when they sold the testator's interest under the lease to the defendant colliery company. In January, 1906, serious subsidences took place, with the result that a great amount of damage was done to property on the surface, and it was stated by counsel that eighty other actions awaited the result of the present appeal. Mr. Justice Ridley held that, notwithstanding the trustees had assigned their testator's interest in the lease to the colliery company, they were liable for what had occurred under the covenant entered into by the testator contained in the lease. Hence the present appeal of the trustees.

Their Lordships held that the action had been properly brought against the appellants as trustees of the will of the testator, and that the judgment of Mr. Justice Ridley was right. The appeal was accordingly dismissed.

Mr. Tindal Atkinson, K.C., on behalf of the defendants, said his clients intended to take the case to the House of Lords.

CASE UNDER THE WORKMEN'S COMPENSATION ACT.

At the Manchester County-court on the 22nd ult., an action came before Judge Parry in which a labourer named Alfred Scrivener, of Ardwick, sued two contractors, Mr. John Strachan, of Charlotte-street, West Gorton, and Messrs. P. & S. Kearsley, of Twist-lane, Leigh, for compensation. Mr. T. Eastham appeared in support of the claim, Mr. William Cobbett represented Mr. Strachan, and Mr. Dootson appeared for Messrs. Kearsley.

The account given by Mr. Eastham, and confirmed by the applicant, was that the man was in full employment under Messrs. Kearsley until October 12 last. Messrs. Kearsley were sub-contractors under Mr. Strachan, and were engaged in making sidings in connexion with the new extensions of the London and North-Western Railway Company at Longsight. From a number of labourers Scrivener was selected to do certain work on the following Monday. Shortly before two o'clock a "leading man" of Strachan's asked him to apply the brakes to a couple of wagons loaded with setts. In doing this one of his hands was caught between the buffers, and the thumb and part of a finger had to be removed at the Royal Infirmary. He now claimed an award under the Act from both or one of the defendants. Kearsley's contended that he left their service at twelve o'clock, and Strachan's case was that he was certainly not in their employ.

His Honour: In whose employ was he, then? (To Mr. Cobbett): Do you mean he was simply amusing himself?

Mr. Cobbett: I say he had no right to touch the wagons.

Mr. Dootson said that the work of unloading the wagons was Strachan's, and that, as far as Kearsley's were concerned, Scrivener had no right to touch the wagons.

His Honour: Is it not a fact that a workman can proceed against the principal contractor?

Mr. Cobbett: Not if he is not a "workman" at all.

His Honour: You cannot say he was not a "workman" of Kearsley's up to a certain point.

Mr. Cobbett: He is a man who is paid by the hour, and can be sent away any time. His work is not necessarily continuous.

His Honour: No, but the evidence is that he has done a good deal of work.

Mr. Cobbett: It is equivalent to one man asking another to mind a hand-cart while he calls somewhere for a minute. He doesn't expect to be paid. It is merely a matter of goodwill.

Evidence having been called by the respondents to the effect that the "leading man" referred to had not asked applicant for help, and that in the ordinary way Scrivener ought to have finished his job that morning by ten o'clock.

His Honour said it seemed to him that the accident happened while Scrivener was in Kearsley's employ, and there must be an award of 14s. 9d. a week against the respondents, with costs. The question still to be decided was whether Strachan should have an indemnity against Kearsley's. What the law was on that point he did not know. It seemed to him that Scrivener was properly called upon to do the work, and that he was right in responding. If a workman were to hold himself exactly within the four corners of his agreement with his employer, and do absolutely nothing but what he was expressly instructed to do by that employer in order to safeguard himself, the whole work of the country would be stopped at once. His own view was that where, as in this case, work was done for the mutual benefit of contractor and sub-contractor, the liability ought to be a joint one, but no one appeared to have considered this point. It was quite a new one, as far as he knew.

Mr. Cobbett contended that under subsect. 2 of the Act he was fully entitled to an indemnity. It expressly provided that where the principal was liable to pay compensation he should be entitled to be indemnified by any person who would have been liable to pay compensation independently.

Mr. Dootson argued that whilst Strachan might be entitled to an indemnity, it need not be a complete one. It might be made partial.

His Honour, however, interpreted the Act to mean a complete indemnity as far as compensation was concerned. It did not matter who got the benefit of the work which produced the injury. The question was as to who was the employer. If a railway man asked Scrivener to apply a brake, and he did so, he should hold that it was reasonable for Scrivener to do so, unless he had direct instructions to the opposite.

Mr. Cobbett said he would ask for no costs against Messrs. Kearsley, but he took it he would have an indemnity as far as the costs of the applicant were concerned.

His Honour: Yes.—*Manchester Guardian.*

Patents of the Week.

APPLICATIONS PUBLISHED.*

45 of 1907.—J. E. Boaz: *Methods for Automatic Control of Steam, Hot-water, and other Heating Apparatus.*

This relates to means for automatically controlling steam, hot-water, and other heating apparatus in which the combination of an electro-magnet with a thermometer or other thermostatic switch is made use of, and consists in the use of an electro-magnet having an armature connected to the valve or the like to be operated, which is attracted when the circuit is completed through the terminals of the magnet, and a thermometer having electrical contacts through which the circuit is completed when they are connected by the mercury column, in combination with a relay magnet, isolated pedestal and a switch.

624 of 1907.—R. H. Worley: *Revolving Fireplace.*

This relates to a revolving fireplace, consisting of a grate circular in plan and divided by a back extending from the floor to the division between the chimneys, said back having a vertical pivot embedded therein, and rotatable in bearings formed in the floor and the division, in combination with a locking device adapted to retain the grate in any desired position.

923 of 1907.—C. Bull: *Revolving Chimney-tops or Cowls.*

This relates to revolving chimney-tops or cowls, and has for its object to prevent down draughts and reduction of smoke, and to produce a continuous and uninterrupted up draught. The ordinary metal chimney-top or extension is formed with openings, and is surrounded by an outer cylinder or casing supported on brackets. Between the two a revolving shutter is provided, arranged concentric therebetween so that it is free to revolve on a spindle suspended from suitable arms or carriers arranged preferably above the casing. On the top of this revolving shutter a toothed wheel is provided for the purpose of imparting motion to the revolving shutter. To do this a suitable number of revolving fans are made use of, arranged exteriorly of the casing, the spindles of which are preferably arranged horizontally, so that in all weathers one or more of these revolving fans will, by means of pinions attached to the other end of said spindles, by their engagement with the toothed wheel communicate motion to the revolving shutter, and so cause an even suction of air without down draught. The shutters of the revolving inner casing are so shaped, for instance, with vertical blades arranged in louvre fashion that a maximum of effect is obtained with a minimum of risk from down draught.

7,808 of 1907.—A. W. Mantle: *Cleaning Appliances for Flues, more especially intended for use with Kitchen Ranges and Cooking Stoves.*

This relates to cleaning appliances for use in flues or passages subject to the deposit of soot or other matter, and consists in the provision of side scrapers in combination with horizontal scrapers, and a tray or plate provided with openings on which the said scrapers are mounted, the said tray or plate being capable of being drawn forwards over a stationary bottom, which has corresponding openings, through which the soot is discharged.

11,650 of 1907.—G. G. Brodie and A. B. Coleman: *Kitchen or Cooking Ranges, Gas-Stoves, and the like.*

This relates to means for opening the oven doors of kitchen ranges, gas-stoves, and the like by the pressure of the foot on a pedal or foot-lever, and consists of the combination with a pedal or foot-lever of a latch-lifting rod external to the oven, the said latch-lifting rod being arranged on the front face of the body of the oven, and made capable of a vertical rising and falling motion, the lower end of the said rod resting on one arm of the pedal lever and its upper end bearing when the door is closed on the under edge, and near the free end of the pivoted latch.

12,032 of 1907.—F. H. Cooke, T. Chapman, and F. J. Smith: *Dry, Semi-dry, and Stiff Plastic Brick Machines.*

This relates to an arrangement by which the positions of the rollers attached to the connecting rods of dry, semi-dry, and stiff plastic brick machines relatively to the cams with which they engage can be readily and easily adjusted. A stud of steel or other suitable material is rigidly attached to each connecting-rod. On each of these studs is fitted a bush of steel or other suitable material, such as brass or cast-iron, which fits the stud. The outer surface of the bush is made smooth and of a size to fit the holes in the rollers, but is eccentric to the inner holes, which fit the studs. The ends of the bushes next the connecting-rods are provided with a series of holes spaced at suitable intervals, the centre line of these holes being concentric to the studs fixed in the connecting-rods. In each connecting-rod is placed a pin or bolt of steel or other suitable material which will engage with any of these holes as may be desired, and is further arranged so that it can fasten the bush in the position required.

1,052 of 1907.—Ingersoll-Rand Company: *Percussive Tools Operated by Reciprocating Columns of Air.*

This relates to a percussive tool which is operated by reciprocating columns of air, and comprises a division ring dividing the cylinder into front and rear chambers, a piston having front and rear piston-heads, two air-pressor tubes, valveless passages leading from one air-pressor tube to the front ends of the front and rear chambers, and valveless passages leading from the other air-pressor tube to the rear ends of the said chambers, whereby the tool-piston may be operated by reciprocating columns of air.

4,949 of 1907.—J. Rossall and R. D. Preston: *Attachable and Detachable Trap or Fittings for Waste Water-pipes of Small Diameter from Domestic Dwellings.*

This relates to readily attachable and detachable traps or fittings for waste water-pipes from domestic sinks or for application to other waste water outlet-pipes of small diameter from domestic dwellings, and consists in using a simple and readily attachable fitting for application to such pipes, and which fitting embodies a trapping device which allows liquid to flow away, but which on escape of said liquid closes automatically and shuts off the pipe, effectually barring access, so that no sewer or objectionable gas or fumes can ascend the outlet-pipe. Preferably a short coupling length of metal is used which carries the trap device, which takes the shape of a flap-valve with a convex or rounded valve-face, which is acted upon by a weight to cause the same to close automatically.

* All these applications are in the stage in which opposition to the grant of patents upon them can be made.

List of Competitions, Contracts, etc.

For some Contracts still open, but not included in this List, see previous issues. Those with an asterisk (*) are advertised in this Number: Competitions, iv.; Contracts, iv. vi. viii. x.; Public Appointments, xviii.; Auction Sales, xxviii.

Certain conditions, beyond those given in the following information, are imposed in some cases, such as: the advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a bonâ-fide tender unless stated to the contrary.

The date given at the commencement of each paragraph is the latest date when the tender, or the names of those willing to submit tenders, may be sent in.

***** It must be understood that the following paragraphs are printed as news, and not as advertisements: and that while every endeavour is made to ensure accuracy, we cannot be responsible for errors that *may* occur.**

Competitions.

FEBRUARY 12.—**Bacup.**—SCHOOL.—Bacup Education Committee are contemplating the erection of an elementary day school, to be called the Northern School, in Burnley-road, Bacup, and are about to invite competitive designs therefor. Premiums of 20*l.*, 10*l.*, and 5*l.* will be given. Forward to the Secretary of the Education Committee, Rochdale-road, Bacup, in envelopes endorsed "Northern School," names, addresses, a list of works of similar nature carried out, and the terms for undertaking the school if engaged for that purpose.

NO DATE.—**Manchester.**—COKE CUTTING AND SCREENING PLANT.—Schemes for the laying down of a coke cutting and screening plant, comprising cutting machinery, conveying plant, mechanical screens, hoppers, sidings, and turntables, etc. Intending competitors may, on payment of a fee of 2*l.* 2*s.* (1*l.* 1*s.* of which will be returned to bonâ-fide competitors), obtain all information from the engineer, Mr. Gilbert S. Heathcote, 196, Deansgate, Manchester.

Contracts.

BUILDING.

FEBRUARY 1.—**Woodley.**—SCHOOL WORKS.—The Administrative Education Sub-Committee for the Ashton-under-Lyne and Stockport District invite tenders for alterations and additions to the Council school at Woodley, near Stockport. Plans, etc., can be seen at office of Mr. J. W. Bain, Clerk to the said Committee, School Brow, Bredbury, near Stockport, and quantities obtained, on deposit of 1*l.*, on application to Mr. H. Beswick, County Architect, Newgate-street, Chester.

FEBRUARY 3.—**Croydon.**—SMALL ADDITIONS AND ALTERATIONS AT "WAINGATES," LONDON-ROAD, CROYDON.—The specification, etc., may be seen, and bills of quantities, etc., obtained, at the office of Mr. Henry Berney, architect, 104, George-street, Croydon, Surveyor to the Guardians, upon depositing the sum of 3*l.* 3*s.*

FEBRUARY 3.—**Elgin.**—HOUSES.—The mason, carpenter, plumber, slater, plaster, and painter works of:—(1) New House at Wester Clackmarras; (2) new house at Greenside, Tiendland. The plans, etc., may be seen at the office of Mr. John Wittet, architect, Elgin.

FEBRUARY 3.—**Greenwich.**—REFRESHMENT-ROOM.—The Council of the Metropolitan Borough of Greenwich invite tenders from builders carrying on business in the Borough for the erection of a refreshment-room, lavatory, private office, and other works at the Borough Hall, Royal-hill, Greenwich. Copies of the drawings, etc., can be seen, and other particulars obtained, at the office of the architect, Mr. Alfred Roberts, F.R.I.B.A., 92, London-street, Greenwich. Forms of tender can be obtained at the Town Hall, Greenwich-road.

FEBRUARY 3.—**Nantwich.**—CHAPEL.—The Trustees of the United Methodist Church, Nantwich, invite tenders for erecting a new chapel on a vacant site in Pillory-street, near Nantwich Railway Station. Mr. G. E. Bolshaw, architect, 2, Mill-street, Crewe.

FEBRUARY 3.—**Ramsgate.**—WALL.—The Corporation of Ramsgate invite tenders for the erection of a retaining wall and other works at the rear of Smith's-yard, King-street. Specification, etc., can be obtained on payment of 10*s.* at the Borough Engineer's office, Albion House.

FEBRUARY 4.—**Bradford.**—BANDSTAND, ETC.—The Bradford Corporation invite tenders for works of all trades required in the erection of:—(1) New bandstand, Lister Park; (2) bowling-green pavilions, Horton and Wibsey Parks. Drawings, etc., may be seen, and bills of quantities, etc., obtained, on application to the City Architect, Whitaker-buildings, Brewery-street, Bradford.

FEBRUARY 4.—**Dunshaughlin.**—COTTAGES.—Dunshaughlin R.D.C. invite tenders for building thirteen single labourers' cottages. Plans, etc., can be obtained from the Clerk to the R.D.C. on payment of 5*s.*

FEBRUARY 4.—**Plymouth.**—WALLS, ETC.—Devon County Agricultural Association, Plymouth, Committee, invite tenders for taking down, removal, and rebuilding walls and hedges or fences on the site of the showyard at Mount Gould, Plymouth. For particulars, etc., apply to Mr. John Pearse, Hon. Secretary to the Local Committee, 15, Princess-square, Plymouth.

FEBRUARY 5.—**Rathdown.**—COTTAGES.—Rathdown No. 1 R.D.C. invite tenders for completing the building of three pairs of labourers' cottages—one pair at Glencullen and two pairs at Kilternan. Specifications, etc., can be obtained from the Architect to the R.D.C., Mr. R. M. Butler, M.Inst.C.E., 12, Dawson-street, Dublin.

FEBRUARY 5.—**Walton.**—ADDITIONS TO HOSPITAL.—West Derby Guardians invite tenders for alterations and additions to Maternity Hospital, Walton Workhouse, from contractors carrying on business within the Union of West Derby, Township of Toxteth Park, or the Parish of Liverpool. A set of quantities can be obtained from Mr. Harris P. Cleaver, Clerk to the Guardians, Brougham-terrace, West Derby-road, Liverpool, on payment of 2*l.* 2*s.* Specification, etc., can be seen at the office of the architect, Mr. C. H. Lancaster, Brougham-terrace, West Derby-road, Liverpool.

FEBRUARY 6.—**Gelli.**—CHAPEL ALTERATIONS, ETC.—For making certain alterations and additions to Caersalem Wesleyan Chapel, Gelli, Rhondda Valley. Plans, etc., may be seen at office of Mr. W. D. Morgan, M.S.A., architect, 194, Ystrad-road, Pentre.

* FEBRUARY 6.—**Leicester.**—FRUIT SHED.—The Midland Railway Company invite tenders for erection of a fruit shed at Leicester. For further particulars see advertisement in this issue.

* FEBRUARY 6.—**Southend.**—NEW SCHOOL.—Builders wishing to tender for the erection of a new school for Southend Education Committee should send their names to Mr. Walter J. Wood, 26, Alexandra-street, Southend-on-Sea, and 1, Finsbury-circus, E.C. For further particulars see advertisement in this issue.

FEBRUARY 8.—**Ogmore Vale.**—CHAPEL.—The erection of a new chapel at Ogmore Vale for "Calvary" Baptist Church. Plans, etc., may be seen by appointment, and forms and conditions of tender obtained from Mr. Jesse Hurley, architect, 10, Bridgend-road, Aberkenfig.

FEBRUARY 8.—**Stanhope.**—ADDITIONS, ETC.—The Directors of the Stanhope and Weardale Industrial and Provident Society, Ltd., invite tenders for extensive additions and alterations to their central business premises at Stanhope, in the County of Durham. Plans, etc., may be seen, and forms of tender obtained, on application to Mr. J. Thompson, Secretary to the Building Committee, at the Central Office, Stanhope, or to the architect, Mr. W. B. Barron, 3, West View, Blackhill.

* FEBRUARY 10.—**Edgware.**—REPAIRS TO CHURCH.—The Committee of Edgware Parish Church, Middlesex, invite tenders for removal of human remains, drainage, reinstating, and repairing church. For further particulars see advertisement in this issue.

FEBRUARY 10.—**Leeds.**—BUTTRESSES, ETC.—Leeds Corporation invite tenders for the erection and repairing of buttresses, walls, etc., at Cow Beck Bridge, Abbey-road, Horsforth, Leeds. The drawings, etc., may be seen at the City Engineer's office, Municipal Buildings, and bill of quantities obtained, on deposit of 1*l.* 1*s.*

FEBRUARY 10.—**Rawtenstall.**—ELECTRICITY BUILDINGS.—Rawtenstall Corporation invites tenders for the erection of the generating station buildings and chimney stack at Harcholme, near Waterfoot. The plans may be inspected at, and copies of the general conditions, etc., obtained from, the offices of the engineers, Messrs. Lacey, Sillar, and Leigh, 78, King-street, Manchester, on payment of a deposit of 3*l.* 3*s.*

FEBRUARY 13.—**Manchester.**—CONVENIENCES.—Manchester Parks Committee invite tenders for the erection of two sets of conveniences at Delamere-street open space, Openshaw. Drawings may be seen, and specification, etc., obtained, at the office of the City Architect, Town Hall, upon payment of 1*l.* 1*s.* All cheques or postal orders are to be made payable to the order of "The Corporation of Manchester."

FEBRUARY 13.—**Mickle Trafford.**—SCHOOL.—Administrative Sub-Committee for the Chester Union area invite tenders for new Elementary School buildings at Mickle Trafford. Plans, etc., can be seen at the office of Mr. Arthur E. Jones, architect, Hunter-street, Chester, and quantities obtained, on deposit of 1*l.*

* FEBRUARY 15.—**Fenny Stratford.**—NEW AISLE.—The Vicar, etc., of St. Martin's Church, Fenny Stratford, invite tenders for erection of a new aisle and other work. For further particulars see advertisement in this issue.

FEBRUARY 18.—**Blackhill.**—SCHOOL.—The C.C. of Durham invite tenders for new infants' Council School at Blackhill for about 250 infants. Plans, etc., may be seen, and bills of quantities obtained, at the office of Mr. J. J. Eltringham, architect, Derwent-street, Blackhill.

* FEBRUARY 18.—**Bristol.**—P.O. ENLARGEMENT.—The Commissioners of H.M. Works, etc., invite tenders for Bristol Head Post Office enlargement. For further particulars see advertisement in this issue.

* FEBRUARY 18.—**Jersey.**—NEW POST-OFFICE.—The Commissioners of H.M. Works, etc., invite tenders for Jersey new post-office. For further particulars refer to an advertisement in this issue.

FEBRUARY 19.—**Coedpenmaen.**—CHAPEL.—The erection of Bethania Welsh C.M. Chapel at Coedpenmaen, Pontypridd. Plans, etc., can be seen at the office of Mr. Philip J. Jones, architect, "Brynawel," Cilfynydd.

* FEBRUARY 19.—**Surrey.**—LABORATORY.—The Metropolitan Asylums Board invite tenders for the erection of a bacteriological laboratory at Belmont, Surrey. For further particulars see advertisement in this issue.

FEBRUARY 20.—**Grangetown.**—ALTERATIONS TO SCHOOL.—North Riding of Yorkshire C.C. Education Committee invite estimate for the whole of the works required to be done in connexion with the proposed alterations at Grangetown Council School, Bolckow-road. Forms of tender, etc., at the school between the hours of 9 a.m. and 4 p.m. on school days.

FEBRUARY 22.—**Winchester.**—GRAND STAND.—Winchester Pageant Committee invite tenders for the erection of the grand stand at Wolvesey Palace, Winchester. Plans, etc., can be seen, and bills of quantities obtained, at the office of the Engineer, Mr. W. V. Anderson, A.M.Inst.C.E., Guildhall, Winchester.

* MARCH 2.—**Leominster.**—SCHOOL.—The Hertfordshire C.C. invite tenders for Secondary School at Leominster. For further particulars see advertisement in this issue.

NO DATE.—**Devonport.**—ALTERATIONS TO RETORT HOUSE, ETC.—Devonport Corporation invite tenders for proposed alterations to retort house and coal stores at the Gasworks, Devonport. Names of local masonry firms to Mr. Joseph Wm. Buckley, A.M.Inst.C.E., Engineer and General Manager, Gasworks, Devonport.

NO DATE.—**Warrington.**—PAPER BAG WORKS.—For new paper bag works at Howley, Warrington. Apply for copy of quantities, etc., to Mr. A. J. Howcroft, architect, Retiro-chambers, Waterloo-street, Oldham.

ENGINEERING, IRON, AND STEEL.

FEBRUARY 3.—**Portsmouth.**—POINTS, CROSSINGS, ETC.—Portsmouth Corporation Tramways Committee invite tenders for the supply of points, crossings, and junctions. The specification, etc., may be obtained upon application to the Tramways Engineer, Mr. V. G. Lironi, M.Inst.M.E., A.M.Inst.E.E., Engineer's Offices, Fratton-grove, Portsmouth.

FEBRUARY 4.—**Barrow-in-Furness.**—LIFT.—The Corporation invite tenders for the supply and erection of a second inner lift to a double-lift gasholder at their Gasworks at Barrow-in-Furness. Further particulars and conditions to be obtained on application to the Gasworks Manager.

FEBRUARY 4.—**Bradford.**—FRICTION CLUTCHES.—Bradford Guardians invite tenders for two friction clutches for the Bradford Union Hospital. Names to Mr. Fred Holland, Engineer and Architect, Bradford Union Offices, 22, Manor-row, Bradford, who will forward particulars upon receipt of 1*l.* 1*s.* deposit.

FEBRUARY 4.—**London.**—GIRDERS.—The Secretary of State for India in Council is prepared to receive tenders for supply of girders, triangulated. The conditions of contract may be obtained on application to the Director-General of Stores, India Office, Whitehall, S.W.

FEBRUARY 7.—**Rawtenstall.**—PLANT, ETC.—The Corporation of Rawtenstall invite tenders for Contract No. 3.—Balancing set. Contract No. 4.—Rotary transforming plant and static transformers. Contract No. 5.—Boilers, feed pumps, condensers, circulating pumps, steam and water pipes, valves, etc. Copies of the general conditions, etc., may be seen at the offices of the engineers, Messrs. Lacey, Sillar, & Leigh, 2, Queen Anne's-gate, Westminster, and 78, King-street, Manchester, and may be obtained from the former office only on payment of a deposit of 2*l.* 2*s.* for each contract.

FEBRUARY 10.—**Manchester.**—IRON CASTINGS.—Manchester Corporation invite tenders for the supply of ventilating grids and other castings that may be required in connexion with drainage work for the twelve months. Samples may be seen, and forms of tender obtained, on application to Mr. H. Prescott, Manager of the House Drainage Department.

FEBRUARY 10.—**Manchester.**—WATER METERS.—Manchester Corporation invite tenders for water meters. Specifications, etc., may be obtained on application to the Secretary, Waterworks Offices, Town Hall, Manchester.

FEBRUARY 17.—**Manchester.**—CRANE.—Manchester Corporation Tramways Committee invite tenders for the supply and delivery of one 2-ton steam travelling crane. Specifications, etc., may be obtained on application to Mr. J. M. McElroy, General Manager, Tramways Department, 55, Piccadilly, Manchester.

FEBRUARY 18.—**Walton, Liverpool.**—ENGINEERING INSTALLATION.—Liverpool Corporation invite tenders for the engineering installation required in the baths, now in the course of construction at Queen's-drive, Walton. Plans, etc., may be inspected, and particulars obtained, on application to the Engineer and Chief Superintendent, Mr. W. R. Court, at his office, Municipal Offices, Liverpool.

FEBRUARY 19.—**Torquay.**—SLUICE VALVES.—Torquay T.C. invite tenders for the supply of sluice valves and fire hydrants. Forms of tender may be obtained from Mr. Samuel C. Chapman, A.M.Inst.C.E., Water Engineer, Town Hall Chambers, Torquay.

FEBRUARY 21.—**Leeds.**—STEEL PIPES.—Leeds Corporation Waterworks Committee invite tenders for the supply of about 610 tons of 30 in. diameter lap welded steel pipes, and about 3402 tons of 33 in.

diameter lap welded steel pipes, for the second section of the 33-in. pipe line from Kirkby Malzeard to Colsterdale. Tender forms, etc., may be obtained, and drawings seen, at the office of Mr. Charles G. Henzell, Waterworks Engineer, Leeds.

FEBRUARY 24.—**East Ham.**—GENERATING PLANT.—The Corporation of the Borough of East Ham invite tenders for the installation of an approved generating plant. Plans of the several blocks of buildings to be heated, together with descriptive specification, may be obtained on application to Mr. A. H. Campbell, M.Inst.C.E., Borough Engineer, on deposit of 1*l.* 1s.

MARCH 9.—**Glasgow.**—BRIDGE WORKS.—The Corporation of Glasgow invite tenders for the supply, delivery, and erection of two movable bridges over the Forth and Clyde Canal at Dalmuir and Kilbowie. Specification, etc., may be obtained on application to Mr. James Dalrymple, General Manager, 46, Bath-street, Glasgow.

JUNE 30.—**Capetown.**—RAILWAY.—The Corporation of the City of Capetown invite tenders for (*a*) the construction and working of a railway up Table Mountain; (*b*) the erection of a suitable hotel at the termination of the said railway. Particulars, etc., may be obtained at the office of Mr. J. R. Finch, Town Clerk, City Hall, Capetown. Particulars, etc., may also be seen at the offices of the London agents of the Corporation, Messrs. Davis & Soper, 54, St. Mary-axe, E.C.

NO DATE.—**Llantrisant.**—DRIVING A SLANT.—The Torycoed Colliery Company, Ltd., invite tenders for the driving of a proposed slant at Torycoed Farm, near Groesfaen, Cross Inn, Llantrisant. Particulars, etc., may be obtained upon application in writing to Mr. Fred W. Holman, Chartered Secretary, Albert-chambers, —High-street, Cardiff.

MISCELLANEOUS.

FEBRUARY 3.—**Altrincham.**—SWINGS.—Altrincham U.D.C. Parks Committee invite tenders for the supply and erection of two complete sets of iron swings, for their Recreation Ground at Broadheath. Further particulars may be obtained on application to the Surveyor, Town Hall, Altrincham.

FEBRUARY 3.—**Birkenhead.**—STREET WATERING.—The Corporation of Birkenhead invite tenders for supplying any horses and drivers that may be required for hauling the Corporation water carts, and for other purposes. Specifications may be seen, and further information and forms of tender obtained, at the office of Mr. Charles Brownridge, M.Inst.C.E., Borough Engineer and Surveyor, Town Hall, Birkenhead.

FEBRUARY 3.—**Marylebone.**—ROAD WATERING.—St. Marylebone B.C. invite tenders for watering the streets and roads of the north and middle districts. Forms of tenders may be obtained on application at the Town Hall.

FEBRUARY 3.—**Southwick.**—CARTING, ETC.—Southwick U.D.C. invite tenders from contractors residing in the district for horse hire for street watering, and also for general carting. Full particulars, etc., may be obtained on application to the Surveyor to the Council (Mr. Geo. W. Warr), at the Town Hall, Southwick.

FEBRUARY 4.—**Bristol.**—TAKING DOWN, ETC.—The Trustees of Birkin's Charity invite tenders for taking down the dwelling-house, No. 12, Barton-vale, and for erecting new fence, etc. Plan, etc., may be seen at offices of Mr. J. A. Wright, Surveyor, 6, Unity-street, Bristol.

FEBRUARY 5.—**Swansea.**—SCAVENGING.—Swansea R.D.C. invite tenders for the removal of refuse, cleansing of earth closets, etc. Forms of tender, etc., may be obtained from Mr. Edward Harris, solicitor, Clerk, District Council Office, Alexandra-road, Swansea.

FEBRUARY 6.—**Blaydon.**—SCAVENGING.—Blaydon U.D.C. invite tenders for the removal and disposal of contents of ashpits, house refuse, etc., at Rowlands Gill, Smailes Estate, and Lintz Ford. Specification, etc., may be obtained from Mr. Robert Biggins, Sanitary Inspector, at the offices of the Council, Blaydon-on-Tyne.

FEBRUARY 6.—**Weobley.**—HAULING.—Weobley R.D.C. invite tenders for hauling materials for the roads in their district. Forms and particulars can be obtained from the surveyor, Mr. F. Gwillim, Weobley, S.O

FEBRUARY 7.—**Downham.**—TEAM LABOUR.—Downham R.D.C. invite tenders for team labour for the year ending March 31, 1909. Forms of tender can be obtained of Mr. J. S. Parrott, District Surveyor, Downham Market.

FEBRUARY 10.—**Glanford Brigg.**—LEADING MATERIAL.—The R.D.C. of Glanford Brigg invite tenders for leading road material. Forms of tender may be had on application at office of Mr. Frank C. Hett, Clerk, Brigg.

FEBRUARY 11.—**Potterspury.**—CARTING.—The R.D.C. of Potterspury invite tenders for the carting of materials for road maintenance. Forms of tender may be obtained of Mr. J. B. Fairchild, Potterspury, Stony Stratford, Surveyor to the Council.

FEBRUARY 14.—**Holborn.**—SCAVENGING.—Holborn B.C. invite tenders for the removal of all slop, street sweepings, etc., and the removal of dust, refuse, and "trade refuse" from the houses. Copies of the draft contracts and forms of tender will be supplied on application. Mr. Lionel Walford, Town Clerk, Council Offices, 197, High Holborn, W.C.

FEBRUARY 17.—**Bristol.**—AVONMOUTH DOCK WORKS.—For cables for distributing electric current for power and light and electric lighting. Specification, etc., can be obtained from Mr. W. W. Squire, Engineer, Engineer's Office, Cumberland-road, Bristol, on production of a receipt from the Secretary of the Docks Committee showing that 5*l.* has been paid as deposit.

FEBRUARY 28.—**Hull.**—DREDGING.—The Humber Conservancy Board invite tenders for dredging about one million and a quarter cubic yards of material from the southern edge of the Hebble Shoal, near Hull. Plans, etc., may be seen at the office of the engineer to the Board, Mr. A. E. Butterfield, from whom specifications may be obtained.

NO DATE.—**Hereford.**—DEMOLITION.—For demolition of Nos. 78 and 79, St. Owen-street, Hereford. Apply H. D., 22, Carpenter-road, Edgbaston, Birmingham.

PAINTING, etc.

FEBRUARY 3.—**Manchester.**—PAINTING.—Lancashire and Yorkshire Railway Directors invite tenders for painting (thirteen contracts). Specifications and separate forms of tender may be obtained on personal application at the Engineer's Office, Hunt's Bank, Manchester.

FEBRUARY 4.—**Cardiff.**—PAINTING.—Cardiff Corporation invite tenders for painting and renovating the ladies' swimming baths and the laundry at the Guildford-crescent Baths. Specifications, etc., can be obtained on application at the office of the City Engineer, Mr. W. Harpur, M.Inst.C.E., City Hall, Cardiff.

FEBRUARY 4.—**Leeds.**—PAINTING, ETC.—Leeds Corporation invite tenders for cleaning down, painting, etc., the interior of the Dewsbury-road Branch Library. Forms of tender, etc., may be obtained at the City Engineer's office, Municipal Buildings, on payment of a deposit of 1*l.* 1s.

ROADS, SANITARY, AND WATER WORKS.

FEBRUARY 4.—**Caerphilly.**—SEWERS.—Caerphilly U.D.C. invite tenders for the construction of about 2,800 yds. of 9-in. and 12-in. pipe sewers, with manholes and other contingent works, at Beddau and Energlyn, Caerphilly. Drawings, etc., may be seen, and forms of tender obtained, upon application to Mr. A. O. Harpur, Surveyor, Council Offices, Caerphilly, upon depositing the sum of 1*l.* 1s.

FEBRUARY 4.—**Poulton-le-Fylde.**—FLAGGING, ETC.—Poulton-le-Fylde U.D.C. invite tenders for flagging, kerbing, etc. (labour only), in connexion with the improvement of certain public streets within Poulton-le-Fylde. Particulars may be had from Mr. J. B. Moss, Surveyor, U.D.C., Masonic Buildings, Poulton-le-Fylde.

FEBRUARY 4.—**Whitchurch.**—STREET IMPROVEMENTS.—Llandaff and Dinas Powis R.D.C. invite tenders for private street improvement works in Pantbach-road, in the Parish of Whitchurch. Specification may be seen, and bills of quantities obtained, on application to the surveyor, Mr. James Holden, A.M.Inst.C.E., Park House, 20, Park-place, Cardiff.

FEBRUARY 5.—**Kingston-upon-Thames.**—DRAINS.—The Corporation of Kingston-upon-Thames invite tenders for laying down surface-water drains in Richmond-road, and certain roads near thereto. Plan, etc., can be seen at office of Borough Surveyor, Mr. R. Hampton Clucas.

FEBRUARY 5.—**Kinsale.**—STORAGE TANK, ETC.—Kinsale Guardians invite tenders for supplying and erecting a storage tank and carrying out other work in connexion with the water supply of the Workhouse. The plans and specifications are deposited at the office of the Clerk of the Union.

FEBRUARY 5.—**Southampton.**—DRAIN.—The Southampton Harbour Board invite tenders for the construction of surface-water drainage, etc., over a small area of their property on the platform. Drawings, etc., may be seen upon application at office of Harbour Board, Town Quay, Southampton, to Mr. E. Cooper Poole, A.M.Inst.C.E., Engineer to the Board, and bills of quantities, etc., obtained, upon payment of 1*l.*

FEBRUARY 6.—**Havant.**—PROPOSED NEW DRAINAGE.—The Guardians invite tenders from builders in the district for altering the existing drains and laying down new ones at their Workhouse, West-street, Havant. Plans, etc., can be inspected at the office of Mr. A. E. Stallard, S.S.I., Park-road, Havant, between 10 a.m. and 4 p.m.

FEBRUARY 6.—**Heaton Norris.**—TAR MACADAM.—Heaton Norris U.D.C. invite tenders for forming with tar macadam about 2,500 sq. yds. of the carriageway of Tatton-road South and Heaton-road. Plans may be inspected, and a copy of the specification, etc., obtained, upon application to Mr. Walter Banks, A.M.Inst.C.E., Surveyor to the Council, Council Offices, Heaton Moor, on payment of the sum of 1*l.* 1s.

FEBRUARY 6.—**Leeds.**—PAVING, ETC.—Leeds Highways Committee invite tenders for the paving and flagging of streets. Drawings may be seen at the City Engineer's office, Municipal Buildings. Forms of tender, etc., may be obtained, on application at the Highways Office, 155, Kirkstall-road, Leeds.

FEBRUARY 7.—**Neath.**—CAST-IRON SEGMENTS AND FOREBAY GRATING FOR DISCHARGE TUNNEL.—Neath R.D.C. invite tenders for the supply for about 85 tons of cast-iron in tunnel segments (including bolts) and forebay grating for Ystradfellte Reservoir. The drawing may be seen, and specification, etc., obtained, at the offices of the engineers, Messrs. G. H. Hill & Sons, 3, Victoria-street, Westminster, and Albert-chambers, Albert-square, Manchester, upon payment of the sum of 2*l.*

FEBRUARY 7.—**Withington.**—MAKING-UP.—Manchester Corporation (Withington Committee) invite tenders for the several works required in making-up streets. Plans, etc., can be seen, and a form of tender, etc., obtained, from the Surveyor to the Committee, Town Hall, West Didsbury.

FEBRUARY 8.—**Cwmaman.**—ROAD.—The U.D.C. of Aberdare invite tenders for the construction of a new road to Cwmaman. Plans, etc., may be seen at the Surveyor's office, Town Hall, Aberdare.

FEBRUARY 10.—**Dover.**—SEWER.—Dover T.C. invite tenders for supplying and laying a 12-in. stoneware pipe sewer with manholes, etc., in connexion therewith, in Caroline-place and Church-street. Forms of tender, etc., may be obtained on payment of 2*l.* 2s., and conditions, etc., inspected at the office of the Borough Engineer (Mr. W. C. Hawke, A.M.Inst.C.E.), Maison Dieu House, Biggin-street, Dover.

FEBRUARY 10.—**Manchester.**—HOUSE DRAINAGE.—Manchester Corporation invite tenders for the execution of general contractors' and plumbers' work that may be required in connexion with the drainage of houses and other premises, for a period of twelve months. Forms of tender, etc., may be obtained, and samples of work and materials seen, on application to Mr. H. Prescott, Manager of the House Drainage Department, on payment of 1*l.* 1s. for each of the said sections.

FEBRUARY 10.—**Pontardulais.**—SEWERAGE WORKS.—Swansea R.D.C. invites tenders for the works of sewerage at Pontardulais. The contract, drawings, etc., may be inspected at the offices of Mr. Morgan W. Davies, A.M.Inst.C.E., 3, Gloucester-place, Swansea, where also copies of the schedules, etc., may be obtained, on payment of the sum of 2*l.* 2s.

FEBRUARY 10.—**Yardley.**—SEWERAGE.—Yardley R.D.C. invite tenders for the provision and construction of foul-water sewers. Plans, etc., may be seen on application to the Engineer and Surveyor, Mr. Arthur W. Smith, at the Council House, Sparkhill, near Birmingham. Specification, etc., can be obtained on payment of 3*l.* 3s. to Mr. Francis Ladbury Thompson, Clerk of the Council, The Council House, Sparkhill, near Birmingham.

FEBRUARY 12.—**Twickenham.**—STREET WORKS.—Twickenham U.D.C. invite tenders for forming, etc.:—(1) Andover-road; (2) Copthall-gardens. Plans, etc., may be seen, and bills of quantities, etc., obtained, on application at the office of Mr. Fred. W. Pearce, F.S.I., Surveyor to the Council, Town Hall, Twickenham, and the payment at office of Mr. H. Jason Saunders, Clerk to the Council, Town Hall, Twickenham, of a deposit of 1*l.* 1s.

FEBRUARY 13.—**Luton.**—PRIVATE IMPROVEMENT.—Luton T.C. invite tenders for carrying out works of private improvement in Ash-road, New Town-street, Baker-street, Vernon-road, and Hartley-road. Plans, etc., to be seen at office of the Borough Engineer, Town Hall, Luton.

FEBRUARY 17.—**Maidstone.**—STREET WORKS.—The Maidstone U.D.C. invite tenders for the levelling, paving, metalling, flagging, kerbing, channelling, and sewering, etc., of Postley-road. Plans, etc., may be seen, and forms of tender, etc., obtained, on application to Mr. T. F. Bunting, the Borough Surveyor, Fairmeadow, Maidstone.

* FEBRUARY 17.—**Tooting.**—ROADS.—The Wandsworth B.C. invite tenders for making-up and paving Okeburn-road, Tooting. For further particulars see advertisement in this issue.

FEBRUARY 18.—**Newport.**—PIPES.—Newport, Isle of Wight, T.C. invite tenders for:—(1) The supply of 1,128 yds. of 12-in. cast-iron spigot and socket pipes; (2) the carting of the pipes and the excavation for and laying of the same from the Waterworks, Carisbrooke, to the new reservoir there, and the supply of valves, hydrants, etc. Plans of the works may be seen, and specifications, etc., may be obtained, on application at office of Mr. T. Ross Pratt, Town Clerk, Town Clerk's office, 19, Quay-street, Newport (I.W.). A deposit of 2*l.* 2s. is to be made.

FEBRUARY 24.—**Alexandria.**—ASPHALTING.—The Municipality of Alexandria invite tenders for the asphalting of a portion of the Rue Porte Rosette. The guarantee is fixed at 1,300*l.*E. The contract is deposited at the Technical Office.

FEBRUARY 24.—**Penge.**—STREET WORKS.—The U.D.C. of Penge invite tenders for private street works in Plevdell-avenue. Plans, etc., may be seen, and copies of the bill of quantities, etc., obtained, on application to Mr. Herbert W. Longdin, Surveyor, Town Hall, Anerley, S.E., on payment of 2*l.* 2s.

FEBRUARY 29.—**Middlesbrough.**—SEWER.—The Sanitary Committee of the Middlesbrough Corporation invite tenders for the construction of the Tees Valley Sewer. Plan, etc., may be seen, and copies of the bill of quantities, etc., obtained, at the Borough Engineer's office, on payment of the sum of 5*l.*

STONE, MATERIALS, AND STORES.

FEBRUARY 3.—**Birkenhead.**—MATERIALS.—The Corporation of Birkenhead invite tenders for the supply and delivery of stores and materials. Specifications, etc., may be obtained at the office of Mr. Charles Brownridge, M.Inst.C.E., Borough Engineer and Surveyor, Town Hall, Birkenhead.

FEBRUARY 3.—**Birkenhead.**—STORES.—The Corporation of Birkenhead invite tenders for the supply and delivery of stores, as required at the generating stations and tramway depots. Particulars, etc., may be had, and samples inspected, on application to Mr. W. Wyld, M.Inst.M.E., M.Inst.E.E., Borough Electrical Engineer and Tramways Manager, at the Tramway Offices, Laird-street, Birkenhead.

FEBRUARY 3.—**Kingston.**—GRANITE.—The Guardians of the Kingston Union invite tenders for the supply of 100 tons of best blue Guernsey granite spalls, to be delivered at the Norbiton Common Farm, Kingston-road, New Malden. Tenders should be sent to Mr. Jas. Edgell, solicitor, Clerk to the Guardians, Union Offices, Coombe-lane, Kingston-on-Thames.

FEBRUARY 4.—**Belfast.**—STORES.—Midland Railway Company Northern Counties Committee (Ireland) invite tenders for the supply of stores. Patterns and samples can be inspected, on application to the General Stores Department, Belfast. Forms of tender can be obtained on application to Mr. Ellis, Stores Superintendent, York-road Station, Belfast, on prepayment of 6d. for each form.

* FEBRUARY 4.—**Willesden.**—ANNUAL CONTRACTS.—The Willesden D.C. invite tenders for works and materials for one or three years, commencing April 1, 1908. For further particulars see advertisement in this issue.

FEBRUARY 5.—**Dorking.**—BATTEN ENDS.—The Guardians of the Dorking Union invite tenders for the supply of 20 fathoms best yellow deal batten ends. Mr. Wm. James, Clerk to the Guardians, 35, High-street, Dorking.

FEBRUARY 5.—**Grantham.**—MATERIALS.—Grantham R.D.C. invite tenders for the supply of materials (granite and slag). Specification, etc., may be obtained at office of Mr. Aubrey H. Malim, Clerk to the Council, Grantham.

FEBRUARY 5.—**Louth.**—GRANITE, ETC.—The R.D.C. of Louth invite tenders for the supply of 10,000 tons of granite and 3,000 tons of slag (more or less). Forms of tender may be had on application to Mr. F. C. Chard, Clerk, Council House, Louth.

FEBRUARY 5.—**Swansea.**—METALLING.—Swansea R.D.C. invite tenders for the supply of metalling and other materials for the repair of the roads in the Swansea Rural District. Specifications, etc., may be obtained from Mr. Edward Harris, Clerk, District Council Offices, Alexandra-road, Swansea, or from Mr. G. Powell Thomas, Highway Surveyor, Station-road, Fforestfach.

FEBRUARY 6.—**Ely.**—GRANITE, ETC.—Isle of Ely C.C.

...ngate tenders for the supply of broken materials for the repair of main roads. Specifications and forms on application to Mr. H. Farr Simpson, County Surveyor, Northern Division, Wisbech; Mr. H. S. W. Perkins, County Surveyor, Southern Division, Ely.

FEBRUARY 6.—**Gravesend.**—GRANITE.—Gravesend and Milton Guardians require a cargo of Guernsey granite spalls, from 180 to 200 tons, to be delivered into the Stoneyard, Arthur-street, Gravesend. Forms of tender to be had on application at office of Mr. Wm. Jno. King, Clerk to the Guardians.

FEBRUARY 6.—**Warrington.**—MATERIALS.—Warrington Paving and Sewerage Committee invite tenders for the supply of Rawtenstall kerbs, blue bricks, chequered tiles, etc. Also for carting for the Highway and Scavenging Departments for the twelve months. Specifications and samples may be seen, and forms of tender, etc., obtained, at the office of the Borough Surveyor, Town Hall.

FEBRUARY 6.—**West Ham.**—DISINFECTANTS.—West Ham Education Department invite tenders for disinfectants for use in the schools. Forms of tender and further particulars may be obtained at the Town Clerk's office, 95, The Grove, Stratford, E.

FEBRUARY 7.—**Blackburn.**—GRANITE SETTS.—Blackburn Highway Committee invite tenders for the supply of 1,000 tons of 6-in. by 3-in. to 3½-in. granite setts. Mr William Stubbs, A.M.Inst.C.E., Borough and Water Engineer, Municipal Offices, Blackburn.

‡ FEBRUARY 7.—**Rotherhithe.**—CEMENT, ETC.—The London C.C. invites tenders for supply and delivery, at the lake in Southwark Park, of Portland cement and yellow clay suitable for puddle. For further particulars see advertisement in this issue.

FEBRUARY 8.—**Padiham.**—PIPES.—Padiham U.D.C. invite tenders for the supply and delivery of 212 yds. of 12in. cast-iron pipes. Form of tender obtained from the office of the Engineer, Mr. J. Gregson, C.E. Town Hall, Padiham.

FEBRUARY 10.—**Belfast.**—PILES.—Belfast Harbour Commissioners invite tenders for the supply of about 50 round piles, 37 ft. long each, and about 512 round piles, 33 to 35 ft. long each, all to be 6 in. at the toe and not less than 12 in. at the top, to the satisfaction of the Harbour Engineer, Mr. W. Redfern Kelly, M.Inst.C.E., from whom any further particulars may be obtained.

FEBRUARY 10.—**East Retford.**—GRANITE, ETC.—East Retford R.D.C. invite tenders for the supply of broken granite and slag. Forms of tender, etc., will be sent by Mr. Thomas Henry, Surveyor, Surveyor's office, East Retford, Notts, upon receipt of a stamped addressed foolscap envelope.

FEBRUARY 10.—**Goole.**—TAR.—The U.D.C. of Goole invite tenders for the removal of their surplus tar during the twelve months (approximately 400 to 500 tons). Further information may be obtained on application to Mr. T. E. Franklin, Engineer, Gasworks, Goole.

FEBRUARY 10.—**Gravesend.**—MATERIALS.—Gravesend T.C. invite tenders for materials and goods. Lists of materials and goods, conditions of tendering, etc. may be obtained at the office of the Borough Treasurer, Town Hall.

FEBRUARY 10.—**Sheffield.**—MATERIALS.—Sheffield Tramways Committee invite tenders for the supply of stores. Particulars, etc., may be obtained, and samples of stores inspected, on application at the office of Mr. A. R. Fearnley, the General Manager, Tramways Department, Division-street, Sheffield.

FEBRUARY 11.—**Potterspury.**—MATERIALS.—The R.D.C. of Potterspury invite tenders for the supply of granite (broken and unbroken) and slag. Forms of tender, etc., may be obtained on application to Mr. James B. Fairchild, Potterspury, Stony Stratford, the Surveyor to the Council.

FEBRUARY 11.—**Salisbury.**—GRAVEL.—The R.D.C. of Salisbury invite tenders for the supply of stones and gravel. Forms may be obtained at office of Mr. Wm. H. Jackson, Clerk to the Council, Market House-chambers, Salisbury.

* FEBRUARY 12.—**Chiswick.**—WORKS AND STORES.—The Chiswick U.D.C. invite tenders for execution of work and supply of stores for one year, etc., from April 1 next. For further particulars see advertisement in this issue.

FEBRUARY 12.—**Halifax.**—MATERIALS, ETC.—Halifax Corporation invite tenders for the supply of stores and materials. Forms, etc., may be obtained on application to Mr. James Lord, M.Inst.C.E., Borough Engineer, Town Hall, Halifax.

FEBRUARY 12.—**Hollingbourn.**—ROAD MATERIALS.—The R.D.C. of Hollingbourn invite tenders for the supply and delivery of road materials. Particulars, etc., on application to Mr. H. J. Bracher, Clerk to the Council, 33, Earl-street, Maidstone.

FEBRUARY 12.—**Reigate.**—MATERIALS.—Reigate R.D.C. invite tenders for supply of granite flints, gravel, etc. Forms may be obtained on application to the surveyor, Mr. Arthur J. Head, 51, High-street, Reigate, Surrey.

FEBRUARY 12.—**Wolverhampton.**—LIME.—The Sewerage Committee invite tenders for the supply and delivery of lime. Specifications, etc., may be obtained from Mr. Wm. Clifford, A.M.Inst.C.E., Manager, Sewage Outfall Works, Wolverhampton.

FEBRUARY 13.—**Frome.**—STORES.—The Frome U.D.C. invite tenders for the supply of materials. Particulars, etc., may be obtained upon application to Mr. F. W. Jones, A.M.Inst.C.E., the Public Offices, Frome.

FEBRUARY 13.—**Rathmines.**—SUPPLIES.—The U.D.C. of Rathmines and Rathgar invite tenders for the supply of arc lamp carbons, incandescent lamps, etc. Forms to be obtained at the Electrical Engineer's office, Town Hall, Rathmines, co. Dublin.

FEBRUARY 13.—**Woolwich.**—ROAD MATERIAL.—Woolwich B.C. invite tenders for the supply of road material, stores, etc. Forms, etc., can be obtained at the offices of Mr. J. Rush Dixon, M.Inst.C.E., Borough Engineer, Town Hall, Woolwich.

FEBRUARY 14.—**Horncastle.**—ROAD MATERIAL.—The R.D.C. of Horncastle invite tenders for the supply of about 6,485 tons of granite (XX) and about 1,440 tons of slag (1¾ in.). Specifications, etc., may be obtained on application at the office of the Council.

FEBRUARY 15.—**Bedford.**—ROAD MATERIAL.—Bedfordshire C.C. invite tenders for the supply of broken granite, slag, flints, etc. Particulars, etc., may be obtained at the office of the County Surveyor, Shire Hall, Bedford.

FEBRUARY 17.—**Richmond (Surrey).**—MATERIALS.—Richmond (Surrey) T.C. invite tenders for the supply of ironfounders' work, tools, road materials, etc. Forms of tender, etc., may be obtained from Mr. J. H. Brierley, Borough Surveyor.

FEBRUARY 17.—**Salford.**—MATERIALS.—Salford Tramways Committee invite tenders for twelve months' supply of materials. Forms of tender and further particulars may be obtained on application to the General Manager, Tramway Offices, 32, Blackfriars-street, Salford.

FEBRUARY 18.—**Lewes.**—ROAD MATERIALS.—East Sussex C.C. Roads and Bridges Committee invite tenders for the supply of materials, cartage, and team labour. Further particulars, etc., can be obtained on application to Mr. F. J. Wood, A.M.Inst.C.E., County Surveyor, County Hall, Lewes.

FEBRUARY 18.—**Lewisham.**—SUPPLIES.—Lewisham B.C. invite tenders for sewerage jobbing works, road materials, horse hire, etc. Specifications, etc., may be obtained at the offices of the Borough Surveyor, Town Hall, Catford, or will be remitted on receipt of stamped and addressed foolscap envelope.

FEBRUARY 18.—**London.**—STORES.—The Metropolitan Borough of Islington invite tenders for contracts for one year. Forms of tender, etc., may be obtained on application at the Town Hall, Upper-street, N.

FEBRUARY 18.—**Long Sutton.**—GRANITE, ETC.—Long Sutton U.D.C. invite tenders for the supply of granite and slag—granite, 400 tons XX, broken; slag, 200 tons 1½ in., broken. Also separate tenders for granite, 20 tons X, broken; slag, 300 tons 2½ in., broken. Mr. Saml. S. Mossop, Clerk to the Council, Long Sutton, Lincolnshire.

FEBRUARY 19.—**Canterbury.**—MATERIALS.—Canterbury Roads and Survey Committee invite tenders for the supply and delivery of materials. Specifications, etc., may be obtained on application to Mr. Arthur C. Turley, A.M.Inst.C.E., City Surveyor, City Surveyor's office, Guildhall-street, Canterbury.

FEBRUARY 21.—**Leeds.**—CAST-IRON PIPES, ETC.—Leeds Corporation Waterworks Committee invite tenders for the supply of about 939 tons of cast-iron spigot and socket pipes of 33 in., 30 in., and 12 in. diameter, and about 270 tons of irregular pipes and castings for the second section of the pipe line from Kirby Malzeard to Colsterdale. Tender forms, etc., may be obtained, and drawings seen, at the office of Mr. Charles G. Henzell, Waterworks Engineer, Leeds.

FEBRUARY 21.—**Leeds.**—MATERIALS.—Leeds Tramways Committee invite tenders for the supply of materials. Conditions of contract and tender forms may be obtained on application to Mr. J. B. Hamilton, General Manager, Tramways Office, City-square, Leeds.

FEBRUARY 21.—**Leeds.**—PIPES.—Leeds Corporation Waterworks Committee invite tenders for the supply of about 610 tons of 36-in. diameter lap-welded steel pipes, and about 3,402 tons of 33-in. diameter lap-welded steel pipes, for the second section of the 33-in. pipe line from Kirkby Malzeard to Colsterdale. Tender forms, etc., may be obtained, and drawings seen, at the office of Mr. Charles G. Henzell, Waterworks Engineer, Leeds.

FEBRUARY 29.—**Derby.**—MATERIALS, ETC.—The Guardians of the Derby Union invite the names of Derby tradesmen who are willing to undertake repairs at, or to supply materials or goods to, the Workhouse. Written applications should reach the Clerk to the Guardians, Poor Law Offices, Becket-street, Derby.

Public Appointments.

Nature of Appointment.	By whom Advertised.	Salary.	Application to be in
*QUANTITY SURVEYOR	Derbyshire Education Com.	3*l.* per week	Feb. 6
*CLERK OF WORKS	County of Southampton	3*l.* 3*s.* per week	Feb. 10

Auction Sales.

Nature and Place of Sale.	By whom Offered.	Date of Sale
*BRICK, LIME, AND CEMENT MERCHANT'S STOCK, NINE ELMS—On the Premises	Clement B. Broad	Feb. 3
*FREEHOLD PROPERTY, WHITECROSS-STREET, E.C.—At the Mart	Reynolds & Eason	Feb. 13
*ARTIFICIAL STONE WORKS AND QUARRIES, NEAR WREXHAM—At the Mart	Fuller, Horsey, Sons, & Cassell	Feb. 24
*FREEHOLD PROPERTIES, BATTERSEA, KENSINGTON, CHELSEA, ETC.—At the Mart	Debenham, Tewson, Richardson, & Co.	March 3

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

January 16.—By LANGRIDGE & FREEMAN (at Maidstone).

Yalding, Kent.—Upton and Charlton's Farms, 70 a. 2 r. 30 p., f. £3,300

January 21.—By FURBERS'.

Paddington.—Hampden-st., f. g. rents 301*l.* 6*s.*, reversion in 34 yrs. (in lots) 8,895

By CHAS. SAUNDERS & SON.

Kensington.—Victoria-rd., l.g. rents 72*l.*, u.t. 18 yrs., g.r. 24*l.* 600

Barnsbury.—Hemingford-rd., l.g. rents 60*l.*, u.t. 31 yrs., g.r. 15*l.* 3*s.* 525

Hemingford-rd., l.g. rents 80*l.*, u.t. 35 yrs., g.r. 30*l.* 635

Pimlico.—11, 12, 13, 14, 16, 17, 18, and 19, Hindon-pl., u.t. 15 yrs., g.r. 19*l.* 11*s.*, w.r. 124*l.* 6*s.* 360

By J. C. PLATT (at Clapham).

Balham.—53, Cathles-rd., u.t. 83 yrs., g.r. 6*l.*, y.r. 32*l.* 260

January 22.—By DOUGLAS YOUNG & CO.

Kingsland-rd.—5, 6, 7, and 8, Hare-walk, u.t. 81½ yrs., g.r. 8*l.*, w.r. 54*l.* 12*s.* 250

Battersea.—35, Ingrave-st., u.t. 41½ yrs., g.r. 4*l.*, w.r. 35*l.* 2*s.* 210

January 23.—By JAMES W. COADE.

Bloomsbury.—8 and 9, Devonshire-st., f., w.r. 252*l.* 4*s.* 2,000

By W. A. ELLIS.

Aldgate.—2, Goodman's-yd.; also the "Golden Lion" p.h., f., y.r. 80*l.* with reversion £1,150

Whitechapel.—122, Middlesex-st. (s.), f., y.r. 75*l.* 1,400

Stepney.—1, Mountford-st., f., y.r. 30*l.* 410

9, 11, and 13, Mountford-st., f., y.r. 50*l.* 850

By C. C. & T. MOORE.

Shoreditch.—330, Old-st. (s), f., y.r. 120*l.* 1,900

City.—27, Aldgate High-st. (s), f., y.r. 150*l.* 2,710

Whitechapel.—22, Commercial-rd. East (s.), f., y.r. 175*l.* 2,400

Bloomsbury.—30, Upper Bedford-pl. and 1, Woburn-mews, u.t., 12½ yrs., g.r. 24*l.*, y. and e.r. 150*l.* 330

City.—36, Aldgate High-st., business premises, u.t., 39 yrs., g.r. 100*l.*, y.r. 425*l.* 3,425

By NEWBON, SHEPHARD, & EDWARDS.

Canonbury.—48, Beresford-rd., u.t. 41¼ yrs., g.r. 8*l.* 10*s.*, y.r. 52*l.* 10*s.* 340

35, Clephane-rd., u.t. 39½ yrs., g.r. 10*l.*, y.r. 60*l.* 380

Islington.—Oxford House, Downham-rd., and 17, Sherborne-st. (s.), u.t. 34½ and 72½ yrs., g.r. 2*s.*, y.r. 75*l.* 10*s.* 650

Canonbury.—87, Grosvenor-rd. (s.), u.t. 41¼ yrs., g.r. 5*l.*, y.r. 90*l.* 640

Crouch End.—52, Park-rd. (s.), f., y.r. 36*l.* 425

Shepherd's Bush.—4 and 5, Bamborough-gdns., f., y.r. 90*l.* 1,025

By STIMSON & SONS.

Hoxton.—28, Hemsworth-st., u.t. 23 yrs., g.r. 4*l.* 4*s.*, y.r. 34*l.* £170

Deptford.—88, Evelyn-st., u.t. 40 yrs., g.r. 10*l.*, y.r. 55*l.* 300

Clapton.—176, Chatsworth-st. (s.), f., y.r. 50*l.* .. 780

Forest Gate.—34, 36, and 40, Bignold-rd., f., w.r. 105*l.* 6*s.* 825

Barnes.—23, 25, 27, and 29, Eleanor-gr., u.t. 61 yrs., g.r. 16*l.*, w.r. 100*l.* 2*s.* 400

By BOYTON, SONS, & TREVOR.

Croydon.—4 and 5, Alexandra-buildings (s.), f., y.r. 135*l.* 2,300

January 24.—By GREEN & SON.

Hampton Wick.—Seymour-rd., "Merton," f., e.r. 40*l.* 380

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; p. for possession; e.r. for estimated rental; w.r. for weekly rental; q.r. for quarterly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; la. for lane; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gdns. for gardens; yd. for yard; gr. for grove; b.h. for beerhouse; p.h. for public-house; o. for office; s. for shops; ct. for court.

TO CORRESPONDENTS.

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications; and the Editor cannot be responsible for drawings, photographs, manuscripts, or other documents, or for models or samples, sent to or left at this office, unless he has specially asked for them.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

All communications must be authenticated by the name and address of the sender whether for publication or not. No notice can be taken of anonymous communications.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article, or to execute or lend a drawing for publication, is given subject to the approval of the article or drawing, when received, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance. The Editor cannot undertake to read and consider articles offered for acceptance unless they are type-written.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

MEETINGS.

FRIDAY, JANUARY 31.

Glasgow Architectural Craftsmen's Society.—Mr. J. S. Boyd on "The Construction of a Gothic Vault." 8 p.m.

Royal Institution.—Professor E. Rutherford, M.A., on "Recent Researches on Radio-Activity." 9 p.m.

SATURDAY, FEBRUARY 1.

Royal Institution.—Mr. Lionel Cust, M.A., on "Anthony Van Dyck."—I. 3 p.m.

MONDAY, FEBRUARY 3.

Royal Institute of British Architects.—(1) To announce the name of the person the Council propose to submit as a fit recipient of the Royal Gold Medal, 1908; (2) Professor W. R. Lethaby to deliver an address to students; (3) Mr. E. Guy Dawber to read a criticism of the works submitted for the prizes and studentships, 1907-1908; (4) At the conclusion of the above the presentation of prizes will be made by the President. 8 p.m.

Liverpool Architectural Society.—Mr. H. T. Hare on "The Planning of Public Libraries," illustrated by drawings. 6 p.m.

University of London (South Kensington).—Mr. Banister Fletcher on "Towers, Spires, Rood Screens, etc." 8 p.m.

Royal Society of Arts (Cantor Lecture).—"The Theory and Practice of Clockmaking," by Mr. H. Hardinge Cunynghame, C.B.—Lecture III. 8 p.m.

TUESDAY, FEBRUARY 4.

Royal Institution.—Professor F. J. Haverfield, M.A., F.S.A., on "Roman Britain: its Interior and Civilisation."—II. 3 p.m.

Institution of Civil Engineers.—Papers to be further discussed—(1) "Experimental Investigations of the Stresses in Masonry Dams Subjected to Water Pressure," by Sir John W. Ottley, K.C.I.E., and Mr. A. W. Brightmore. (2) "Stresses in Dams: An Experimental Investigation by Means of India-rubber Models," by Messrs. John S. Wilson and William Gore. (3) "Stresses in Masonry Dams," by Mr. E. P. Hill. 8 p.m.

WEDNESDAY, FEBRUARY 5.

Northern Architectural Association.—Conversazione in the Grand Assembly Rooms, Barras Bridge, Newcastle-upon-Tyne. 7.30 p.m. to 10.30 p.m.

Edinburgh Architectural Association.—Mr. A. R. Myers on "Materials." 8 p.m.

Builders' Foremen and Clerks of Works' Institution.—Ordinary meeting of the members. 8 p.m.

Institute of Sanitary Engineers, Ltd.—A sessional meeting, when Mr. P. M. Fraser will read a paper entitled "Foundations, with Special Reference to Modern Methods and Plant."

THURSDAY, FEBRUARY 6.

Institution of Electrical Engineers.—Mr. J. S. Peck on "Protective Devices for High Tension Transmission Circuits." 8 p.m.

FRIDAY, FEBRUARY 7.

Architectural Association.—Mr. C. Harrison Townsend on "Garages and Motor-Houses." 7.30 p.m.

Royal Institution.—Mr. Humphry Ward, M.A., on 'Napoleon and the Louvre." 9 p.m.

Junior Institution of Engineers (Royal United Service Institution, Whitehall).—Paper on "Aerial Navigation," by Mr. Herbert Chatley, B.Sc.Eng. 8 p.m.

Institution of Civil Engineers (Students' Meeting).—Mr. P. T. Steinthal, B.Sc., on "Electric Hardening and Annealing Furnaces." 8 p.m.

Royal Society of Arts (Shaw Lecture on Industrial Hygiene).—"The Hygiene of the Pottery Trade," by Mr. W. Burton, F.C.S. 8 p.m.

SATURDAY, FEBRUARY 8.

Royal Institution.—Mr. Lionel Cust, M.A., on "Anthony Van Dyck."—II. 3 p.m.

Junior Institution of Engineers.—Anniversary dinner at the Hotel Cecil, Strand. 7 p.m.

TERMS OF SUBSCRIPTION.

"THE BUILDER" (Published Weekly) is supplied DIRECT from the Office to residents in any part of the United Kingdom at the rate of 19s. per annum, and Canada 21s. 6d. (52 numbers) PREPAID. To all parts of Europe, America, Australia, New Zealand, India, China, Ceylon, etc., 26s. per annum.

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PRICES CURRENT OF MATERIALS.

**** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£ s. d.	
Hard Stocks	1 6 0	per 1000 alongside, in river.
Rough Stocks and Grizzles	1 5 0	„ „ „
Picked Stocks for Facings	2 10 0	„ delivered.
Flettons	1 5 6	„ at railway depôt.
Red Wire Cuts	1 14 0	„ „ „
Best Fareham Red	3 12 0	„ „ „
Best Red Pressed Ruabon Facing	5 0 0	„ „ „
Best Blue Pressed Staffordshire	3 15 0	„ „ „
Do. Bullnose	4 0 0	„ „ „
Best Stourbridge Fire Bricks	3 14 0	„ „
GLAZED BRICKS.		
Best White and Ivory Glazed Stretchers	12 0 0	„ „ „
Headers	11 0 0	„ „ „
Quoins, Bullnose, and Flats	16 0 0	„ „ „
Double Stretchers	19 0 0	„ „ „
Double Headers	16 0 0	„ „ „
One Side and two Ends	19 0 0	„ „
Two Sides and one End	20 0 0	„ „ „
Splays, Chamferred, Squints	20 0 0	„ „ „
Best Dipped Salt Glazed Stretchers, and Header	12 0 0	„ „ „
Quoins, Bullnose, and Flats	14 0 0	„ „ „
Double Stretchers	15 0 0	„ „ „
Double Headers	14 0 0	„ „ „
One Side and two Ends	15 0 0	„ „ „
Two Sides and one End	15 0 0	„ „ „
Splays, Chamferred, Squints	14 0 0	„ „ „
Second Quality White and Dipped Salt Glazed	2 0 0	„ less than best.

	s. d.	
Thames and Pit Sand	6 6	per yard, delivered.
Thames Ballast	5 0	„ „
Best Portland Cement	30 0	per ton, „
Best Ground Blue Lias Lime	19 6	„ „

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime ..... 12s. 0d. per yard, delivered.
Stourbridge Fireclay in sacks 27s. 0d. per ton at rly. dpt.

STONE.

	s. d.	
BATH STONE—delivered on road waggons, Paddington Depôt	1 6½	per ft. cube.
Do. do. delivered on road waggons, Nine Elms Depôt	1 8½	„ „
PORTLAND STONE (20 ft. average)—		
Brown Whitbed, delivered on road waggons, Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf	2 1	„ „
White Basebed, delivered on road waggons, Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf	2 2½	„ „

	s. d.	
Ancaster in blocks	1 10	per ft. cube, deld. rly. depôt.
Beer „	1 6	„ „
Greenshill „	1 10	„ „
Darley Dale in blocks	2 4	„ „
Red Corsehill „	2 2	„ „
Closeburn Red Freestone	2 0	„ „
Red Mansfield „	2 4	„ „
YORK STONE—*Robin Hood Quality.*		
Scappled random blocks	2 10	„ „
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2 3	per ft. super., „
6 in. rubbed two sides ditto, ditto	2 6	„ „
3 in. sawn two sides slabs (random sizes)	0 11½	per ft. cube, „
2 in. to 2½ in. sawn one side slabs (random sizes)	0 7½	„ „
1½ in. to 2 in. ditto, ditto	0 6	„ „
HARD YORK—		
Scappled random blocks	3 0	„ „
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2 8	per ft. super. „
6 in. rubbed two sides ditto	3 0	„ „
3 in. sawn two sides slabs (random sizes)	1 2	„ „
2 in. self-faced random flags	0 5	„ „

SLATES.

In. In.	£ s. d.	
20×10 best blue Bangor	13 2 6	per 1000 of 1200 at r. d.
20×12 „ „	13 17 6	„ „
20×10 first quality, „	13 0 0	„ „
20×12 „ „	13 15 0	„ „
16×8 „ „	7 5 0	„ „
20×10 best blue Portmadoc	12 12 6	„ „
16×8 „ „	6 12 6	„ „
20×10 best Eureka unfading green	15 17 6	„ „
20×12 „ „	18 7 6	„ „
18×10 „ „	13 5 0	„ „
16×8 „ „	10 5 0	„ „

SLATES (*continued*).

In. In.	£ s. d.	
20×10 permanent green	11 12 6	per 1000 of 1200 at r. d.
18×10 „ „	9 12 6	„ „
16×8 „ „	6 12 6	„ „

TILES.

	s. d.	
Best plain red roofing tiles	42 0	per 1000 at rly. depôt.
Hip and Valley tiles	3 7	per doz. „
Best Broseley tiles	50 0	per 1000 „
Do. Ornamental tiles	52 6	„ „
Hip and Valley tiles	4 0	per doz. „
Best Ruabon red, brown, or brindled do. (Edwards)	57 6	per 1000 „
Do. Ornamental do.	60 0	„ „
Hip tiles	4 0	per doz. „
Valley tiles	3 0	„ „
Best Red or Mottled Staffordshire do. (Peakes)	51 9	per 1000 „
Do. Ornamental do.	54 6	„ „
Hip tiles	4 1	per doz. „
Valley tiles	3 8	„ „
Best "Rosemary" brand plain tiles	48 0	per 1000 „
Best Ornamental tiles	50 0	„ „
Hip tiles	4 0	per doz. „
Valley tiles	3 8	„ „
Best "Hartshill" brand plain tiles, sand-faced	50 0	per 1000 „
Do. pressed	47 6	„ „
Do. Ornamental do.	50 0	„ „
Hip tiles	4 0	per doz. „
Valley tiles	3 6	„ „

WOOD.

BUILDING WOOD.	At per standard. £ s. d.	£ s. d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	13 10 0	... 15 0 0
Deals: best 3 by 9	13 0 0	... 14 0 0
Battens: best 2½ in. by 7 in. and 8 in., and 3 in. by 7 in. and 8 in.	11 0 0	... 12 0 0
Battens: best 2½ by 6 and 3 by 6	0 10 0	less than 7 in. and 8 in.
Deals: seconds	1 0 0	less than best.
Battens: seconds	0 10 0	„ „
2 in. by 4 in. and 2 in. by 6 in.	9 0 0	... 10 0 0
2 in. by 4½ in. and 2 in. by 5 in.	8 10 0	... 9 10 0
Foreign Sawn Boards—		
1 in. and 1¼ in. by 7 in.	0 10 0	more than battens.
¾ in.	1 0 0	„
Fir timber: best middling Danzig or Memel (average specification)	At per load of 50 ft. 4 10 0	... 5 0 0
Seconds	4 0 0	... 4 10 0
Small timber (8 in. to 10 in.)	3 12 6	... 3 15 0
Small timber (6 in. to 8 in.)	3 0 0	... 3 10 0
Swedish balks	2 10 0	... 3 0 0
Pitch-pine timber (30 ft. average)	4 0 0	... 4 15 0

JOINERS' WOOD.	At per standard.	
White Sea: first yellow deals, 3 in. by 11 in.	24 0 0	... 25 0 0
3 in. by 9 in.	22 0 0	... 23 0 0
Battens, 2½ in. and 3 in. by 7 in.	16 10 0	... 18 0 0
Second yellow deals, 3 in. by 1 in.	18 10 0	... 20 0 0
„ „ 3 in. by 9 in.	17 10 0	... 19 0 0
Battens, 2½ in. and 3 in. by 7 in.	13 10 0	... 14 10 0
Third yellow deals, 3 in. by 11 in. and 9 in.	13 10 0	... 15 0 0
Battens, 2½ in. and 3 in. by 7 in.	11 0 0	... 12 0 0
Petersburg first yellow deals, 3 in. by 11 in.	21 0 0	... 22 10 0
Do. 3 in. by 9 in.	18 0 0	... 19 10 0
Battens	13 10 0	... 15 0 0
Second yellow deals, 3in. by 11in.	16 0 0	... 17 0 0
Do. 3 in. by 9 in.	14 10 0	... 16 0 0
Battens	11 0 0	... 12 10 0
Third yellow deals, 3 in. by 11 in.	13 0 0	... 14 0 0
Do. 3 in. by 9 in.	12 10 0	... 14 0 0
Battens	10 0 0	... 11 0 0
White Sea and Petersburg—		
First white deals, 3 in. by 11 in.	14 10 0	... 15 10 0
„ „ 3 in. by 9 in.	13 10 0	... 14 10 0
Battens	11 0 0	... 12 0 0
Second white deals, 3in. by 11 in.	13 10 0	... 14 10 0
„ „ 3 in. by 9 in.	12 10 0	... 13 10 0
„ „ battens	10 0 0	... 11 0 0
Pitch-pine: deals	18 0 0	... 21 0 0
Under 2 in. thick extra	0 10 0	... 1 0 0
Yellow pine—First, regular sizes	44 0 0	upwards.
Oddments	32 0 0	„
Seconds, regular sizes	33 0 0	„
Yellow Pine oddments	28 0 0	„
Kauri Pine—Planks, per ft. cube	0 3 6	... 0 5 0
Danzig and Stettin Oak Logs—		
Large, per ft. cube	0 3 0	... 0 3 6
Small „ „	0 2 6	... 0 2 9
Wainscot Oak Logs, per ft. cube	0 5 6	... 0 6 0
Dry Wainscot Oak, par ft. sup. as inch	0 0 8½	... 0 0 9½
¾ in. do. do.	0 0 7	... —
Dry Mahogany—Honduras, Tabasco, per ft. super. as inch	0 0 9	... 0 1 0
Selected, Figury, per ft. super. as inch	0 1 6	... 0 2 6
Dry Walnut, American, per ft. super. as inch	0 0 10	... 0 1 6
Teak, per load	17 0 0	... 22 0 0
American Whitewood Planks, per ft. cube	0 4 0	... 0 5 0
Prepared Flooring, etc.—	Per square.	
1 in. by 7 in. yellow, planed and shot	0 13 6	... 0 17 0
1 in. by 7 in. yellow, planed and matched	0 14 0	... 0 18 0
1¼ in. by 7 in. yellow, planed and matched	0 16 0	... 1 0 0
1 in. by 7 in. white, planed and shot	0 12 0	... 0 14 6
1 in. by 7 in. white, planed and matched	0 12 6	... 0 15 0
1¼ in. by 7 in. white, planed and matched	0 15 6	... 0 16 6
¾ in. by 7 in. yellow, matched and beaded or V-jointed brds.	0 11 0	... 0 13 6
1 in. by 7 in. „ „	0 14 0	... 0 18 0
¾ in. by 7 in. white „ „	0 10 0	... 0 11 6
1 in. by 7 in. „ „	0 12 9	... 0 15 0

6 in. at 6d. to 9d. per square less than 7 in.

JOISTS, GIRDERS, &c.

	In London, or delivered Railway Vans, per ton. £ s. d.			£ s. d.	
Rolled Steel Joists, ordinary sections	7	10	0	8	0 0
Compound Girders, ordinary sections	9	10	0	10	10 0
Steel Compound Stanchions	12	0	0	13	0 0
Angles, Tees, and Channels, ordinary sections	9	10	0	10	10 0
Flitch Plates	9	10	0	10	10 0
Cast Iron Columns and Stanchions including ordinary patterns	8	0	0	9	0 0

METALS.

	Per ton, in London. £ s. d.			£ s. d.	
IRON—					
Common Bars	8	10	0	9	0 0
Staffordshire Crown Bars, good merchant quality	8	15	0	9	5 0
Staffordshire "Marked Bars"	10	10	0	—	
Mild Steel Bars	8	15	0	9	5 0
Hoop Iron, basis price	9	5	0	9	10 0
" " Galvanised	17	0	0	—	
(*And upwards, according to size and gauge.)					
Sheet Iron Black—					
Ordinary sizes to 20 g.	9	15	0	—	
" " 24 g.	10	15	0	—	
" " 26 g.	12	5	0	—	
Sheet Iron, Galvanised, flat, ordinary quality—					
Ordinary sizes, 6 ft. by 2 ft. to 5 ft. to 20 g.	15	0	0	—	
Ordinary sizes to 22 g. and 24 g.	15	10	0	—	
" " 26 g.	16	10	0	—	
Sheet Iron, Galvanised, flat, best quality—					
Ordinary sizes to 20 g.	18	0	0	—	
" " 22 g. and 24 g.	18	10	0	—	
" " 26 g.	20	0	0	—	
Galvanised Corrugated Sheets—					
Ordinary sizes, 6 ft. to 8 ft. 20 g.	14	10	0	—	
" " 22 g. and 24 g.	14	15	0	—	
" " 26 g.	16	5	0	—	
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g. and thicker	12	0	0	—	
Best Soft Steel Sheets, 22 g. & 24 g.	13	0	0	—	
" " " 26 g.	15	0	0	—	
Cut Nails, 3 in. to 6 in.	10	10	0	11	0 0
(Under 3 in., usual trade extras.)					

LEAD, &c.

	Per ton, in London. £ s. d.			£ s. d.	
LEAD—Sheet, English, 3lb. and up.	17	15	0	—	
Pipe in coils	18	5	0	—	
Soil pipe	20	15	0	—	
Compo pipe	21	15	0	—	
ZINC—sheet—					
Vieille Montagne ton	28	0	0	—	
Silesian	27	15	0	—	
COPPER—					
Strong Sheet per lb.	0	1	1	—	
Thin "	0	1	2	—	
Copper nails "	0	0	11	—	
Copper wire "	0	0	10	—	
BRASS—					
Strong Sheet "	0	1	0	—	
Thin "	0	1	1	—	
TIN—English Ingots "	0	1	4	—	
SOLDER—Plumbers' "	0	0	7	—	
Tinmen's "	0	0	9	—	
Blowpipe "	0	0	11	—	

ENGLISH SHEET GLASS IN CRATES OF STOCK SIZES

15 oz. thirds	2½d. per ft. delivered
" fourths	1¾d. " "
21 oz. thirds	3¼d. " "
" fourths	2¼d. " "
26 oz. thirds	4¼d. " "
" fourths	3¼d. " "
32 oz. thirds	5d. " "
" fourths	4¼d. " "
Fluted Sheet, 15 oz.	3¼d. " "
" 21 oz.	4¼d. " "

ENGLISH ROLLED PLATE IN CRATES OF STOCK SIZES.

¼ Hartley's	2¼d. per ft. delivered.
⅜ "	2¾d. " "
½ "	3d. " "
Figured and Oxford Rolled "Oceanic" Glass, white	4d. " "
Do. " tinted	5½d. " "

OILS, &c.

		£ s. d.
Raw Linseed Oil in pipes	per gallon	0 2 1
" " " in barrels	"	0 2 2
" " " in drums	"	0 2 3
Boiled " in pipes	"	0 2 2
" " " in barrels	"	0 2 3
" " " in drums	"	0 2 4
Turpentine in barrels	"	0 3 3
" in drums	"	0 3 5
Genuine Ground English White Lead	per ton	22 10 0
Red Lead, Dry	"	22 0 0
Best Linseed Oil Putty	per cwt.	0 7 0
Stockholm Tar	per barrel	1 12 0

VARNISHES, &c.

	Per gallon. £ s. d.
Fine Pale Oak Varnish	0 8 0
Pale Copal Oak	0 10 6
Superfine Pale Elastic Oak	0 12 6
Fine Extra Hard Church Oak	0 10 0
Superfine Hard-drying Oak, for seats of Churches	0 14 0
Fine Elastic Carriage	0 12 6
Superfine Pale Elastic Carriage	0 16 0
Fine Pale Maple	0 16 0
Finest Pale Durable Copal	0 18 0
Extra Pale French Oil	1 1 0
Eggshell Flatting Varnish	0 18 0
White Copal Enamel	1 4 0
Extra Pale Paper	0 12 0
Best Japan Gold Size	0 10 6
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 8 0
Berlin Black	0 16 0
Knotting	0 10 9
French and Brush Polish	0 10 6

TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays.* [N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is stated, nor any list in which the lowest Tender is under 100*l.*, unless in some exceptional cases and for special reasons.]

* Denotes *accepted.* † Denotes *provisionally accepted.*

BALDOCK (Herts).—For the erection of Hostel, for Les Sœurs de Marie Joseph. Messrs. Underwood & Kent, architects, 19, Leys-avenue, Letchworth, Herts. Quantities by architects:—

G. Mitchell	£5,401 6 8	H. E. Hurst	£4,335 0 0
Beckley & Turpie	4,725 0 0	S. Redhouse & Son, Stotfold*	4,164 0 0
J. T. Openshaw & Co.	4,700 0 0	A. E. Jeffs	4,084 0 0
T. Raban & Son	4,538 0 0		

[Architects' estimate, £4,248 11 7.]

BILSTON.—For new schools, Bullholes, Bilston. Messrs. Bailey & McConnal, architects, Bridge-street, Walsall:—

T. Speake	£18,000	G. H. Marshall	£14,997
J. W. Smith	16,675	J. Dallow & Sons	14,850
Tilt Bros	16,050	T. Johnson	14,847
F. Davis	16,085	C. Carr & Sons	14,775
F. L. Jones	15,990	G. Webb	14,737
W. & J. Webb	15,850	H. Dorse	14,647
Hammond Bros.	15,893	T. Mason	14,556
J. Barnsley & Sons	15,800	Cuthbert	14,525
H. Willcock & Co.	15,785	T. Tildesley	14,475
J. W. Smith	15,750	R. Speake & Sons	14,400
W. Wistance	15,735	T. & S. Ham	14,400
J. Bowen & Sons	15,555	W. Hopkins	14,200
T. Hardy	15,498	W. Kendrick & Son	14,195
Pattinson & Sons	15,479	Hacksley Bros.	14,175
W. Sapcote	15,450	C. Griffiths	14,098
Smith & Son	15,449	T. Fish & Sons	13,933
J. Guest & Sons	15,100	H. Gough & Son	13,850

BRIGHTON.—For repairs, etc., at seven houses at Brighton, for the Trustees of the Sutton Estate. Mr. E. C. P. Monson, F.R.I.B.A., Architect to the Sutton Estate, 182, High-street, Acton, W., and 22, Buckingham-street, Adelphi, W.C.:—

W. T. Ashdown, 31, East-street, Brighton* £586 7 0

BROADSTAIRS.—For alterations and additions to the Rumfields pumping station, for the Broadstairs and St. Peter's Urban District Council. Mr. H. Hurd, C.E., Council Offices, Broadstairs:—

W. W. Martin	£576 0 0	W. J. Ballard & Co.	£470 10 0
Hayward & Paramor	563 0 0	A. E. Goodburn, Elms House, Ramsgate*	470 0 0
R. S. Goodburn	559 0 0		
Paramors, Ltd.	509 19 4		
G. Miriams	493 0 0		

CARDIFF.—For paving, kerbing, and channelling footways, Staines-street and other streets, for the Corporation:—

Staines-street. Pencesley-lane. Mucan-lane.
C. Davis‡ £166 1 11 .. £91 18 0 .. £127 4 6
Burlington-terrace. Hurmace-street.
Osmond & Son‡ .. £308 19 8 .. £407 1 1

‡Recommended for acceptance.

DARTMOUTH.—For erecting a residence, Mayor's-avenue, for Mrs. Way. Mr. E. H. Beck, architect, Dartmouth. Quantities by architect:—

G. Row	£273 17 6	R. Pillar	£252 0 0
H. Anderson	266 7 6	Back & Walls*	252 0 0
F. Gullett	260 0 0	Triggs & Pillar	240 17 0
S. Maunder	259 0 0	Broad & Triggs	237 0 0

[All of Dartmouth.]

DUDLEY.—For erecting new Carnegie Free Library, St. James's-road, for the Corporation. Mr. G. H. Wenyon, architect, 194, Wolverhampton-street, Dudley:—

M. Round & Sons, Dudley £6,645

ENFIELD.—For making up Catherine-road (part of), Enfield Lock, for the Urban District Council. Mr. B. Collins, Surveyor, Public Offices, Enfield:—

T. Adams	£771	Jennings & Grenfell	£630
Bell & Sons	747	E. J. Betts, Enfield-highway*	611
E. F. Knifton	640		

GRAYS.—For erecting a refreshment kiosk and a dressing-shed, etc., at Public Recreation Ground known as "The Beach," for Grays Thurrock Urban District Council:—

		Extra for match-lining the Dressing-shed.
Brown Bros.	£1,050 0 0	£32 0
G. B. Rous	993 5 0	39 12
H. Philbey	588 6 2	22 10
E. Catton, Jun.*	537 0 0	22 0

[All of Grays.]
[Surveyor's estimate, £569.]

HIGHAM'S PARK (Essex).—For erecting new blocks for boys' and girls' departments at Selwyn-avenue, for the Walthamstow Education Committee. Mr. M. H. Prosser, Architect to the Committee. Quantities by Mr. G. T. G. Wright, 3, Gt. Winchester-street, E.C.:—

R. F. & W. Peachy	£15,087
A. G. Barton	12,932
J. Smith & Sons	12,843
F. Webster & Son	12,825
L. F. Lamplough	12,481
F. J. Coxhead	12,258
F. G. Minter	12,249
Spencer, Santo, & Co.	12,095
R. & E. Evans	11,998
W. J. Maddison	11,889
J. & J. Dean	11,850
Brand, Pettit, & Co.	11,837
Rowley Bros.	11,584
A. Fairhead & Son	11,564
F. & E. Davey	11,487
B. E. Nightingale	11,415
J. S. Hammond & Son	10,963
Clark & Sons, Cambridge*	10,203

HULL.—For alterations to Messrs. Moor & Robsons Breweries, Ltd., Locomotive Hotel, Hessle-road. Messrs. Harbron & Robson, architects, 50, Spring Bank, Hull. Quantities by Mr. John Watson, Bowalley-lane, Hull:—

C. Greenwood	£1,800 0 0
Hull General Builders, Ltd.	1,773 10 0
J. Morrell & Son	1,772 0 0
F. Southern	1,757 0 0
H. J. Kirkwood	1,750 1 0
G. Houlton & Son	1,734 0 0
T. Goates	1,715 0 0
J. Taylor & Son	1,708 7 6
Jackson & Oates	1,699 15 0
J. I. Levitt	1,690 0 0
M. Harper	1,688 10 0
J. Simpson & Son	1,665 0 0
J. Carr	1,660 19 0
G. Jackson & Sons	1,615 6 0
P. J. Kettlewell	1,609 0 0
T. Bayes & Son, Hull*	1,462 16 0

[Internal fittings and painting not included in these tenders.]

LONDON.—For Western District Parcel Office and Mayfair Telephone Exchange:—

		Cr.
C. W. Bovis & Co.	£16,879	£131
H. C. Clifton	16,170	230
Martin, Wells, & Co., Ltd.	15,499	—
J. Appleby & Sons	15,246	300
W. F. Blay	14,865	200
J. & W. Drake	14,796	200
Mowlem & Co., Ltd.	14,354	—
F. Webster & Sons	14,336	50
Shurmur & Sons, Ltd.	14,215	—
W. Laughton	14,250	115
Jarman, Daws, & Co., Ltd.	14,133	—
W. H. Lawden & Son	14,285	190
J. Barker & Co., Ltd.	14,176	100
F. G. Minter	13,975	—
Patman & Fotheringham	13,880	—
Smith & Appleton	13,850	50
Clark & Sons	14,000	205
W. Johnson & Co., Ltd.	13,959	205
Holloway Bros (Ldn.), Ltd.	13,730	—
Simpson & Son	13,930	220
A. F. Vigor & Co.	13,770	100
W. Wallis	13,726	200
J. Smith & Sons, Ltd.	13,667	200
F. & H. F. Higgs	13,285	—
B. E. Nightingale	13,295	50
Perry Bros.	13,448	351
H. J. Williams, Ltd.	13,147	200
Galbraith Bros.*	12,998	190
Wisdom Bros.	12,794	—
J. & W. T. Inkpen	12,274	—

HANLEY.—For storm relief sewers and private street improvements, for the Borough Council. Mr. Joseph Lobley, Borough Engineer and Surveyor, Hanley:—

—	Heathcote-street	Austin-street	Etruscan-road	Blackburn-road.	Addison-street.	Burnley-street.	Cromwell-street.	Back Lichfield-street.	Back Fenton-road.	Back Leek-road.	Back Leonard-road.	Back Acton-street No. 2.	Back Hamilton-road.	Back Burnley-street.	Back Acton-street No. 1.	Storm Sewers, Leek-road and Austin-street
	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£
J. Taylor & Son	446	125	223	222	100	204	111	33	38	56	39	48	23	166	130	488
F. Barke	370*	106*	192	196	89	182	105	29	35	51	35	44	22	152	119	350
A. T. Brown	386	113	195	208	88	186	106	30	37	53	37	47	23	160	125	—
Sanders & Torrance	396	112	194	209	91	190	108	30	38	53	36	45	23	154	121	412
W. Williams	426	116	198	214	92	193	110	30	36	52	36	45	23	154	120	380
T. Godwin	478	129	214	229	108	224	126	27*	33*	47*	32*	40*	20*	137*	107*	330*
J. Hopwood	—	—	—	—	—	—	—	29	37	51	37	47	23	159	124	—
A. Bullock	398	116	199	206	89	183	107	30	37	52	36	45	22	154	120	—
J. Law	654	172	298	322	150	327	177	48	56	85	56	75	37	258	201	504
W. Bullock	385	108	189*	186*	85*	175*	101*	28	35	49	34	43	21	144	113	361

LONDON.—For certain work at 12 to 24, Half Moon-lane, Herne Hill, on the Sutton Estate, to comply with the London Building Acts (Amendment) Act. Mr. E. C. P. Monson, F.R.I.B.A., Architect to the Sutton Estate, 182, High-street, Acton, W., and 22, Buckingham-street, Adelphi, W.C.:—

F. T. Styles....	£333 19 0	W. Bugg	£216 16 0
W. D. Palmer..	273 17 6	J. W. Leonard..	209 12 6
Ferris Bros.....	226 15 0	E. A. Hough ..	207 10 0

LONDON.—For pulling down houses, Nos. 84 to 87, in Chiswell-street, Finsbury, E.C., and erecting three warehouses on the site, for Mr. J. A. Curran. Mr. Charles E. Jackson, architect, Broad-street House, New Broad-street, E.C. Quantities by Messrs. Heelis and Wrightson, 26, Budge-row, Cannon-street, E.C.:—

Courtney & Fairbairn.....	£14,423	Goodall & Sons ..	£12,632
Myall & Upson ..	14,350	R. A. Lowe	12,589
J. G. Tennant & Co.	14,138	G. Parker.....	12,546
W. Cubitt & Co. ..	13,154	W. Shurmer & Sons	12,348
W. H. Lacelles & Co.	13,100	J. Styles & Sons ..	12,177
Newell & Lusty ..	13,084	Chessum & Sons ..	12,118
Maxwell Bros.	12,945	Todd & Newman..	12,072
Coles & Sons	12,875	Patman & Fotheringham	11,473
Lole & Co.	12,763		
G. Trollope & Sons and Colls & Sons	12,666		

LONDON.—For pulling down and rebuilding stores and stabling at 7½, Paddington-green, Paddington, for Messrs. Brooks, Phillips, & Co., builder's merchants. Messrs. W. F. Meakin & Son, architects, 6, Martin's-lane, E.C.:—

Patman & Fotheringham, Ltd.	£3,010	T. Henwood & Son .	£2,320
J. Allen & Sons, Ltd.	2,850	Trollope & Sons & Colls & Sons, Ltd.	2,276
Freeman & Barber .	2,840	G. Godson & Sons..	2,227
C. W. Bovis & Co..	2,778	G. Neal	2,187
I. C. Tennant & Co.	2,444	Thompson & Beveridge, 151, Harrow-road*	2,121
B. Colley & Sons ..	2,400		
H. B. Oldrey & Sons	2,325		

LONDON.—For the supply of slot rails, etc., for the London County Council:—

W. Scott & Co., Ltd.	£6,490 0
Frodingham Iron & Steel Co., Ltd., near Doncaster*	5,654 5
Steel, Peech, & Tozer, Ltd. (incomplete tender for slot rails only)	4,462 10

[The Chief Engineer's estimate, comparable with the above tenders, is £5,622 10s.]

LONDON.—For repair of Superintendent's house, Barking outfall works, for the London County Council:—

E. Proctor & Son..	£191 0	W. Harris, North Woolwich*	£153 0
A. Webb	169 0		
J. Stokes & Son ..	161 12		

LONDON.—For hydraulic penstocks, Shad Thames Pumping-station, for the London County Council:—

Thames Iron Works, etc. Co., Ltd. ..	£1,283 0
Glenfield & Kennedy, Ltd.....	1,045 0
J. Blakeborough & Sons.....	921 14
Ashton, Frost, & Co., Ltd., Blackburn*	799 0

MERTHYR TYDFIL.—For alterations and additions at Pant Council Schools, for the Education Committee. Mr. J. Llewellin Smith, Architect, Central-chambers, Merthyr Tydfil:—

A. J. Colborne, Swindon*.....	£2,159 13

PENYDARREN.—For erecting new infants' school, for Merthyr Tydfil Education Committee. Mr. J. Llewellin Smith, Architect, Central-chambers, Merthyr Tydfil:—

A. J. Colborne, Swindon*	£5,099 17

PENYDARREN.—For alterations and additions to Council schools, for Merthyr Tydfil Education Committee. Mr. J. Llewellin Smith, Architect, Central-chambers, Merthyr Tydfil:—

A. J. Colborne, Swindon*	£4,599 14

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PRESCOT.—For sewage disposal works, for the Urban District Council. Mr. H. W. Taylor, Engineer, St. Nicholas-chambers, Newcastle-on-Tyne:—

J. Bentley & Co., 11, Grange-road, Bradford*	£5,093 6 8

REDHILL.—For private street improvements, for Reigate Town Council. Mr. F. T. Clayton, Borough Surveyor, Reigate:—

W. Griffiths & Co., Ltd. ..	£1,001 2 6	G. S. Faulkner	£860 3 1
S. Redhouse & Son	1,001 1 10	Ripley, Strong, & Co.	852 6 10
Fry Bros. ...	984 8 0	T. Free & Sons	822 9 0
Potter & Co..	903 10 2	A. Streeter & Co.	805 10 6
S. Kavanagh & Co.	873 15 10	W. Wilson, Ramsgate*..	790 17 7

ROCHFORD.—For 130 yds. of sewer, for the Rural District Council. Mr. H. T. Sidwell, Surveyor, Rochford:—

S. Norden, Rochford	£41

SHEFFIELD.—For Endcliffe Woods refreshment-room, for the Corporation. Mr. Charles F. Wike, City Surveyor, Town Hall:—

F. T. Walker, Sheffield*	£338 15

SOUTHAMPTON.—For reinstatement of premises after fire at Mousehole-lane, Millbrook, Southampton, for Messrs. Peacock & Buchan, Ltd. Mr. William Burrough Hill, F.S.I., architect, Southampton:—

Playfair & Toole ..	£2,913	J. Douglas.....	£2,459
H. Cawte	2,570	H. Stevens & Co., Southampton* ..	2,280
Jenkins & Sons, Ltd.	2,474		

TIVERTON.—For laying about 1,440 yds. of 3-in. water mains at Bradninch, for the Rural District Council. Mr. R. Ellis, Surveyor, Tiverton:—

W. C. Shaddock.	£213 0 0	G. Pollard & Co., Ltd.	£119 0 0
Hardy, Bate, & Co.....	199 0 0	Nicks Bros., Bradninch*..	110 19 0
W. G. Fisher ..	121 19 6		

WARMINSTER.—For building a reservoir, laying water-mains, etc., at the Reformatory. Messrs. Long & Glass, engineers, 53, Market-place, Warminster:—

J. W. Titt	£168 18	R. Butcher	£133 18
H. Franklin.....	144 0	A. L. Ponton*....	117 0

[All of Warminster.]

WEMBLEY.—For making up Pembroke-road, for the Urban District Council. Mr. Cecil R. W. Chapman, Surveyor, Public Offices, Wembley. Quantities by Surveyor:—

W. Griffiths & Co., Ltd. ..	£1,223 10 1	G. R. Mann ..	£1,019 5 9
W. E. Rhodes.	1,050 0 0	T. Free & Sons	988 15 1
Willis & Powis	1,047 11 8	O. T. Gibbons, Leytonstone*	933 0 0
T. Adams	1,040 8 2		

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